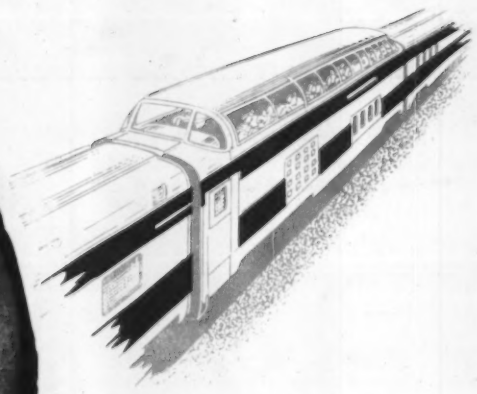
APRIL 30, 1956

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



More Stainless for Your Nickel

"For our purpose, type 201 is interchangeable with 301"—Edward G. Budd Jr., president, Budd Co. . . . page 92

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A translator? The bridge between immediate need and service satisfaction?
In any case, he most often is the practical means to solution of plant problems.

What kind of tubing? Random, multiple or cut lengths? Seamless or welded? How about cost, delivery, specifications? These are but a few of the many questions that he must consider to meet his organization's production and fiscal needs. One of his more valuable functions is knowing whom to call on when confronted with a buying problem.

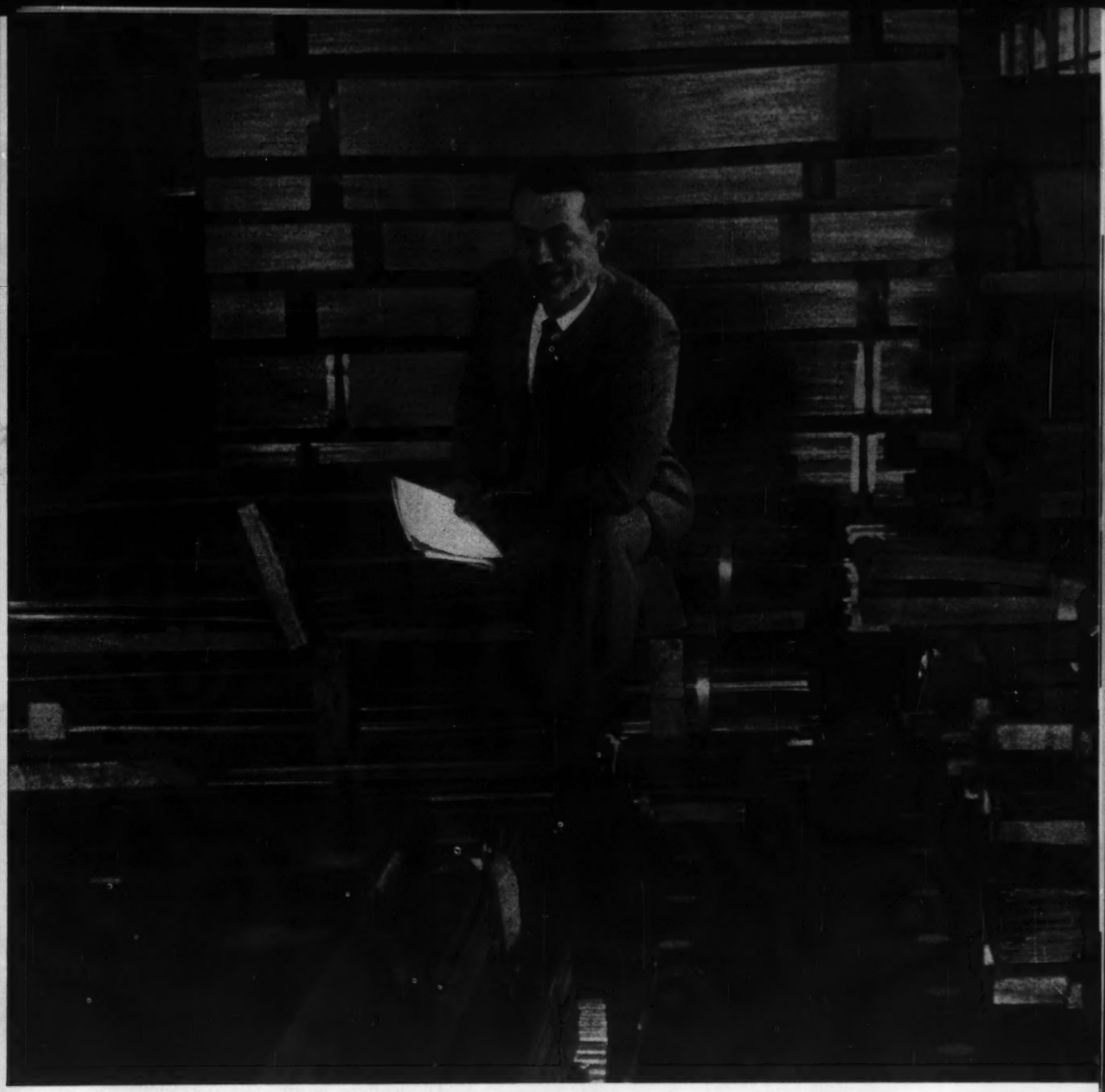
Many practiced P.A.'s, through long experience, find that the facilities of B&W very often satisfy the needs that confront them constantly. They enlist the aid of Mr. Tubes, their link to B&W.

If you don't know Mr. Tubes, maybe the time has come for you to meet him. Call on Mr. Tubes. He can be a big help to you. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

B&W
TUBULAR PRODUCTS DIVISION

TA-5077G

Seamless and welded tubular products, seamless welding fittings and flanges—in carbon, alloy and stainless steels



He makes it so easy to shop for steel

The buyer of steel in small and moderate lots—the buyer who wants immediate delivery—can always turn to the local distributor for the steel he needs.

Ready for shipment out of distributor stocks are large supplies of sheets, strip, plates, structural shapes, bars, tool steel, rod and wire, hardware, wire rope, and many other essential products.

These products are never just "warehoused." They flow into and out of stock daily. They're made ready for delivery on short notice. Most orders are filled and in the customers' hands within 24 hours.

Besides quick deliveries, the distributor offers an amazing variety of services and skills. He quickly cuts sheets to exact lengths and widths. He can flame-cut plates to elaborate patterns. He slits and edges strip, and saws your bars and billets to length. You can go to him for technical advice, and often he has his own laboratory for running tests.

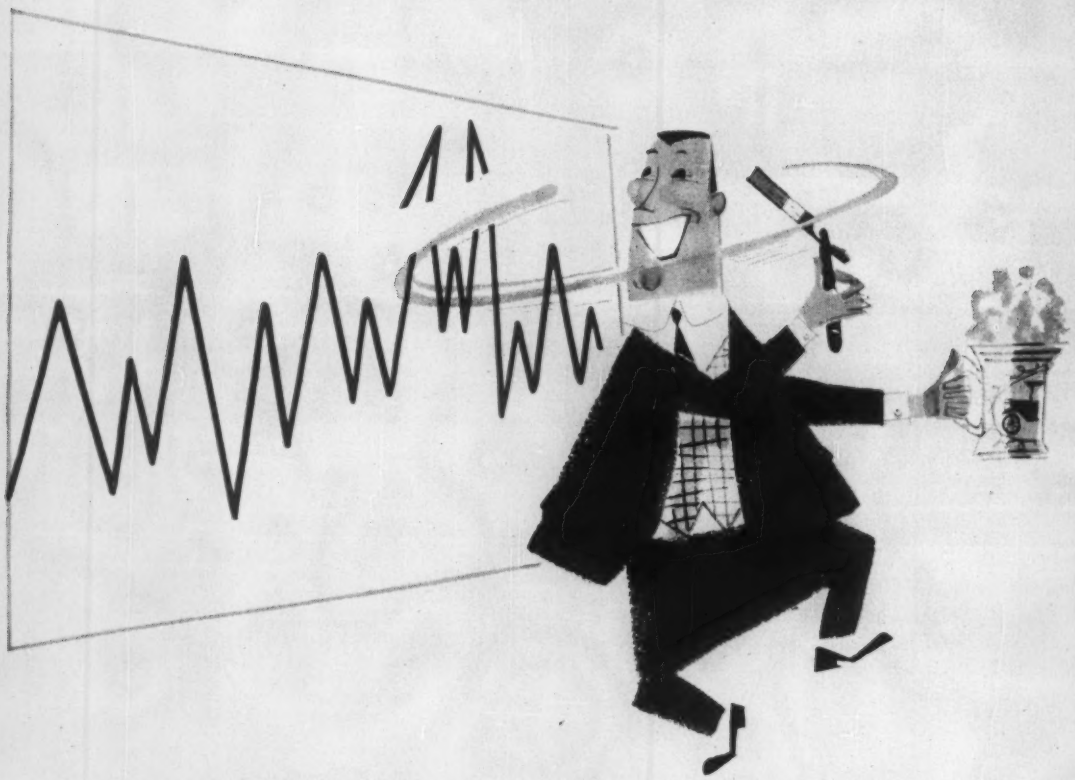
Bethlehem distributors are well supplied with the steels you need. Why not get to know these friendly men? They are anxious to serve you in every possible way.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.
Bethlehem Pacific Coast Steel Corporation
San Francisco

BETHLEHEM STEEL

Call the distributor—your Shopping Center for Steel

PEAK-SHAVING WITH PHILGAS® HELPS AVOID HIGH DEMAND CHARGES FOR GAS



You can really save money by installing a standby Philgas system. Philgas can be put into operation at once when your fuel needs threaten to exceed your contract for natural or manufactured gas. Peak-shaving with Philgas helps keep production costs down by avoiding high demand charges.

And because Philgas is so clean, with no harmful contaminants to injure your products, you can turn out more acceptable products at a low unit cost. Automatic in operation, a Philgas system requires no additional labor costs.

Philgas, America's largest selling LP-Gas, is a high-quality Phillips Petroleum Company product. Philgas contract customers are always assured of a dependable source of supply. Write for complete information.

Philgas is our name for high-quality LP-Gas—Bottled Gas—Butane—Propane.

Phillips 66 Philgas
THE ALL-PURPOSE FUEL

PHILLIPS PETROLEUM COMPANY

Sales Department · Bartlesville, Oklahoma

Offices located in
Amarillo, Tex., Atlanta, Ga., Chicago, Ill., Denver, Colo., Des Moines, Ia., Houston, Tex., Indianapolis, Ind., Kansas City, Mo., Minneapolis, Minn., New York, N. Y., Omaha, Nebr., Raleigh, N. C., Salt Lake City, Utah, St. Louis, Mo., Tampa, Fla., Tulsa, Okla., Wichita, Kans.

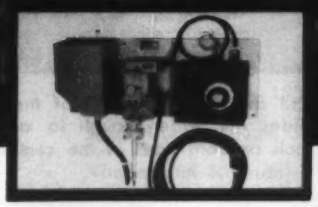
Here's a sure way to speed production and CUT YOUR COSTS without complicated and expensive setups

Savings are being made every day for those that go to Automatic Arc Welding. Output is more than doubled in many cases. Higher quality welds become standard with less experienced weldors.

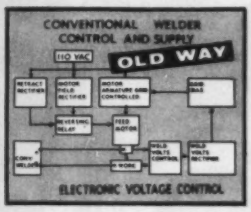
More and more plants are turning to automatic and semi-automatic welding operations to lower costs. The big swing to this new and faster welding is due to Hobart's "SIMPLIFIED" method of controls that eliminate elaborate installations and complicated, troublesome electronic and electrical controls.

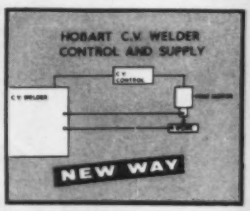
HOBART Powr-o-matic*

(Constant Voltage) Simplified Automatic Welding



The primary function of automatic welding is to maintain a faster, steadier output of higher quality, lower costs welds. Case histories prove this in actual comparison tests. You'll be amazed how easy it is to use automatic welding (the new way) in your own plant. There are many ways it can be adapted to fit right in with your present production methods without making a lot of major changes. You owe it to yourself to investigate the money saving advantages of automatic welding. Without obligation, why not check the coupon below for more information and see what automatic welding can do for you.





Write today to **HOBART BROTHERS CO., Box ST-461, Troy, Ohio, or 'phone 21223**

"One of the world's largest builders of arc welding equipment"

Hobart products known and depended upon throughout the world

Electric Motor Drive • Gas Engine Drive • Engine Drive with Auxiliary Power • D.C. Rectifiers • A.C. Transformers • A.C. Power—A.C. Welder Combination • D.C. Generator Only for Belting • A.C. Power—A.C. Welder Combination Generator Only for Belting • Fully Automatic Submerged Arc • Semi-automatic Welding Gas Migarc • Semi-automatic Submerged Arc • Self Propelled Gas Engine Drive • Carbonair Cutting and Gouging

* ***Powromatic*** is a source of current supply for automatic and semi-automatic welding processes and is of the DC Constant Voltage Type that assures best results and more "Simplified" operation.

To: HOBART BROTHERS COMPANY, BOX ST-461, TROY, OHIO

Tell me more about Automatic Welding, using—☐ "POWROMATIC" and "Simplified" Welding Head. How to adapt our present equipment to ☐ Automatic. ☐ Semi-Automatic submerged arc ☐ Semi-Automatic inert gas.

Send information on manual type arc welders _____ amp.
☐ DC Elec. ☐ DC Engine Dr. ☐ DC Rectifier ☐ AC Trans.

Name_____

Street_____

City_____ State_____

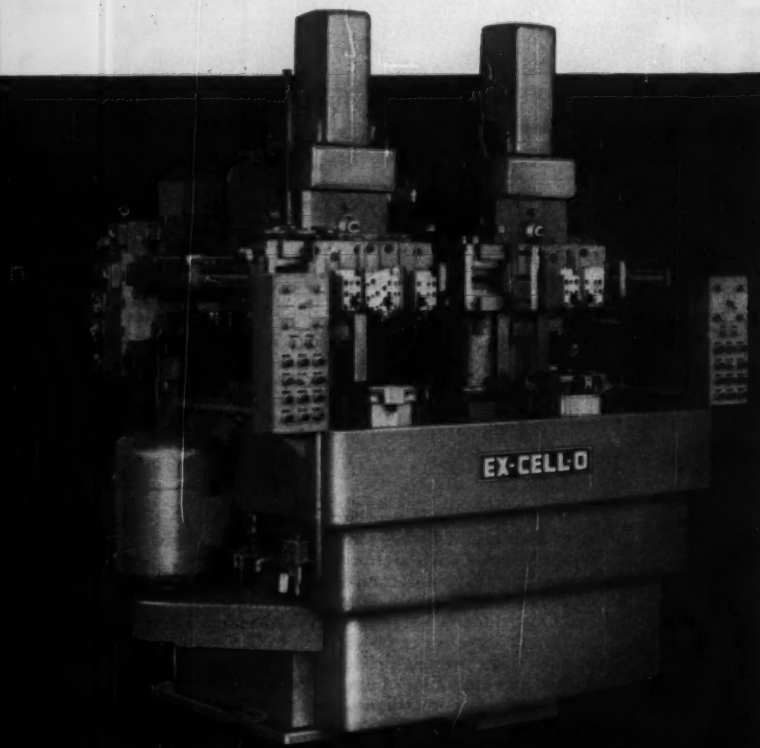
HOBART WELDERS

New, Flexible

EX-CELL-O 2-STATION VERTICAL..

XLO
EX-CELL-O for PRECISION

PERFORMS VARIETY OF PRECISION OPERATIONS



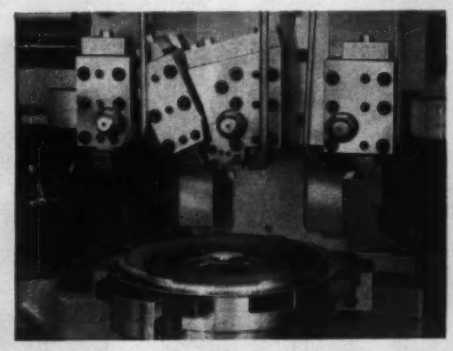
EX-CELL-O STYLE 432 VERTICAL PRECISION BORING MACHINE has two independent hydraulic systems. No cams to change.

The Ex-Cell-O Style 432 completes the operations on both sides of this transmission torque converter cover in one machine cycle.

Ex-Cell-O's new Style 432 Vertical Precision Boring Machine was designed to speed production *where flexibility is essential.* Vertical construction means convenience in loading and unloading parts, also ease in adjusting and changing tools. Precision turning, boring, facing, grooving, and chamfering are performed alone, or in any combination.

Tool one station for operations on one side of a part; tool the other station for different operations on the other side. Or—let both stations do identical operations simultaneously or in sequence. Or—each station works as an independent machine. Different cycles are obtained through switches, and adjustment of dogs and orifices.

For complete information, call your local Ex-Cell-O representative, or write Ex-Cell-O in Detroit for Bulletin.



Tooling and chucking equipment of the left station. Slides are wide enough to accommodate tools on both sides of the centerline of a part.

EX-CELL-O CORPORATION
Detroit 32, Michigan

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES
CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS
AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

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STEEL
The Metalworking Weekly

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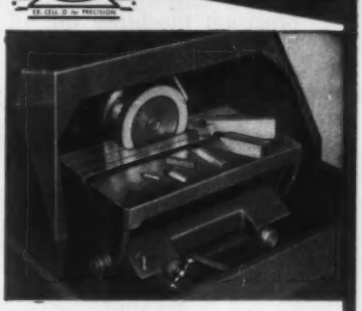
This Sturdy Precision
Tool Grinder
BY EX-CELL-O

XLO



Tables are big to give good support to the tools. They are easily adjustable.

There are Ex-Cell-O Tool Grinders to suit the needs of every shop, large or small. For data on this complete Tool Grinder line, write Ex-Cell-O in Detroit, or call your local Ex-Cell-O representative.

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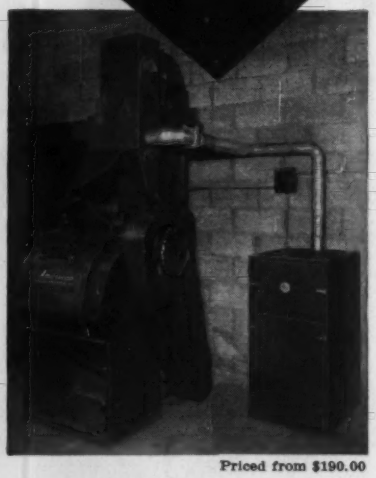
EX-CELL-O
CORPORATION
DETROIT 32, MICHIGAN

how to trap dust
that damages your machines and hurts company morale



Priced from $190.00

easy-to-move
TORIT DUST COLLECTORS
trap dust at its source!

Untrapped dust costs you money, "secretly" forces precision machines out of line, limits production. Torit dust collectors are unitized for custom installation—save more money, usually more efficient than central (built-into-the-building) system. Torit unit operates only when machine or combination of machines it protects are in use. Filtered air may be returned to room to save heat. Many models and sizes, all self-contained, easy to move. Write today to... **DEPT. 506.**

TORIT
MANUFACTURING
COMPANY

Donaldson

311 Walnut Street
St. Paul 2, Minn.

behind the scenes

Vanishing Man

The Census Bureau reports that there are now only 98½-men for every 100 women, and this information disturbs our reflexes: we don't know whether we should be elated or terrified. As the spread between the sexes increases (and it will, Fred; men die off faster than women), polygamy may become a necessary state institution. How would you like to come home after a hard day's work and kiss 15 wives, dandle 45 children on your rheumatic knee, listen to 15 sets of assorted complaints, brace yourself for 15 sets of domestic orders and have your reading reduced to a morbid perusal of department store bills?

True, additional speculation on associated possibilities might be exciting, but before it gets out of hand, leave us return to man and the Census Bureau. Man, the bureau implies, is the natural prey of women, business and the armed services. Competition among those consumers is pretty keen. Employers, for instance, are finding that job applicants are remarkably fussy. "They want high pay, short hours, long vacations, air-conditioned offices and early retirement," personnel men complain. "They want a cross between Marilyn Monroe and Betty Crocker," the leftover women murmur bitterly. The armed services, of course, will accept any man who can see lightning, hear thunder and progress by placing one foot in front of the other.

Shall We Retrogress?

Who is man, the creature everyone wants now that he is growing scarcer? This is a simple question, really; it has been asked every day by thinking persons for about 60,000 years, give or take a few days. Some persons say he is man, genus Homo, family Hominidae, class mammalia, order primates, division anthropoidae, species human, Homo sapiens; so it's no wonder you're lousy with in-laws. One notable defender of biogenesis, doughty Lord Rayleigh, went Bridey Murphy one better: He figured that man originated, in effect, from mosses from other worlds. So hold your hats, folks; here we go, back, back, back to when we were just a hunk of lichen on the moon:

Oh, we used to freeze our setae
When the lunar day was done,
And we closed our little capsules
Til another day'd begun.
Then we roasted in the quiet
Of the blazing lunar noon,
Vegetating in the silence
While our filaments festooned.
We remember moving earthward
With a cloud of spores in flight;
To Erin's Isle we fluttered down
From earth's pale satellite.
Now, when some folks get to bragging,
And shake their fam'ly trees,
You just take them back in fancy
To remote antiquity—
And when they journey with you
All those weary years across,
'Twill be seen their antecedents
Started out as chunks of moss!

Manana—What Else?

An applicant from Argentina whipped in an airmail reply the other day—but it was in reply to a classified ad that ran in STEEL, Feb. 20. We thought they took things easy in the Latin world, but not *that* easy. Classified ads, like time, wait for no etc.

Old Rounder

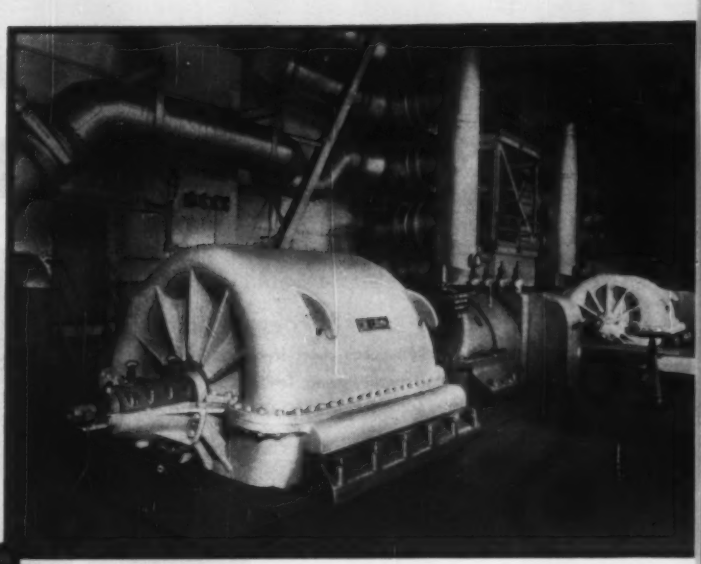
The birthday puzzle was on the up and up. Answer: Wed., Feb. 29, 1888. The gimmick: 1900 was not a leap year. Oddly enough, nobody sent in an answer up to the time this goes to press. Sometimes, questions can be as confusing as puzzles. Ever since researchers suggested that maybe it wasn't David who killed Goliath, we have been beset by doubts at every turn. The Encylopaedia Britannica doesn't take a firm stand on David; the subject is still open, apparently. Well, regardless of whose sling slung the stone, answer this question for us: Who was the first man to travel completely around the earth?

Shrdlu

(Metalworking Outlook—Page 53)

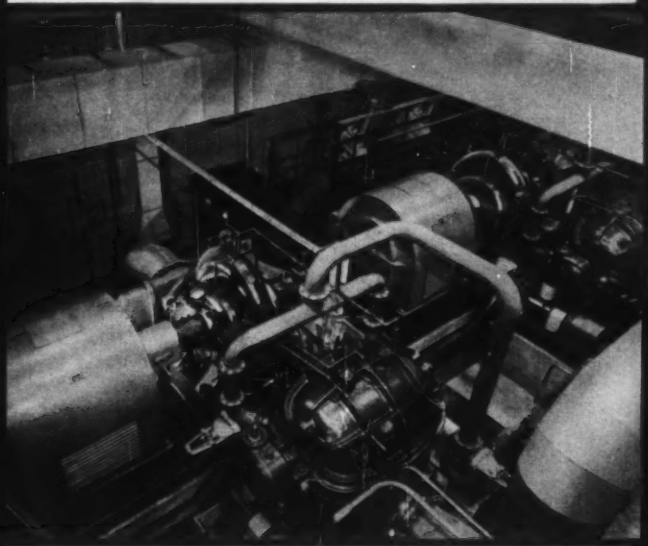
DE LAVAL
CENTRIFUGAL BLOWERS AND PUMPS

stay on the line for years at Jones & Laughlin

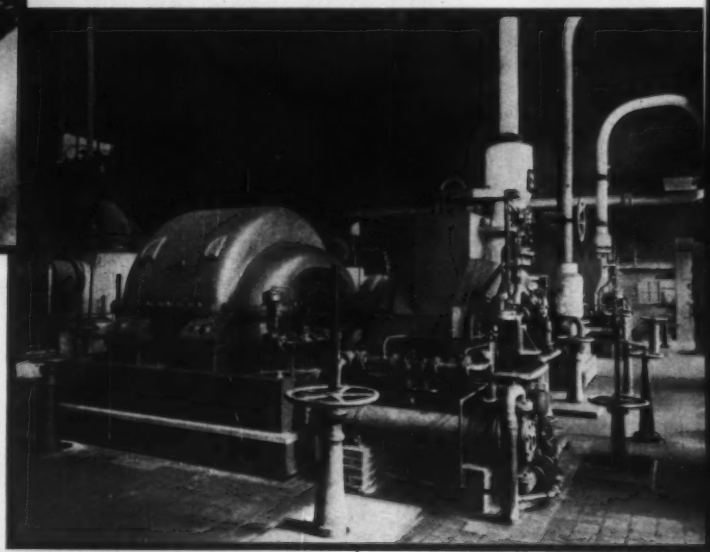


Jones & Laughlin reports: *"We have been using De Laval equipment for many years, and from our experience we have learned that De Laval blowers and pumps are inexpensive to maintain. Service is excellent. We can get spare parts quickly."*

Three De Laval 22,000 gpm motor-driven pumps are on the job at Jones & Laughlin Steel Corporation in Pittsburgh, Pa. These units are used to pump river water to the open hearth and general mill. Installed in October 1951, these three pumps "have not had any downtime at all since their installation except for periodic inspections," Jones & Laughlin reports.



These two De Laval centrifugal blowers, each rated at 100,000 cfm, are in use 24 hours per day, seven days per week except for a yearly inspection period. Since installation, there has been only 24 hours downtime in one of these blowers with a maintenance cost of about $400. "That's very little for this type of equipment," says the Jones & Laughlin blower room foreman.



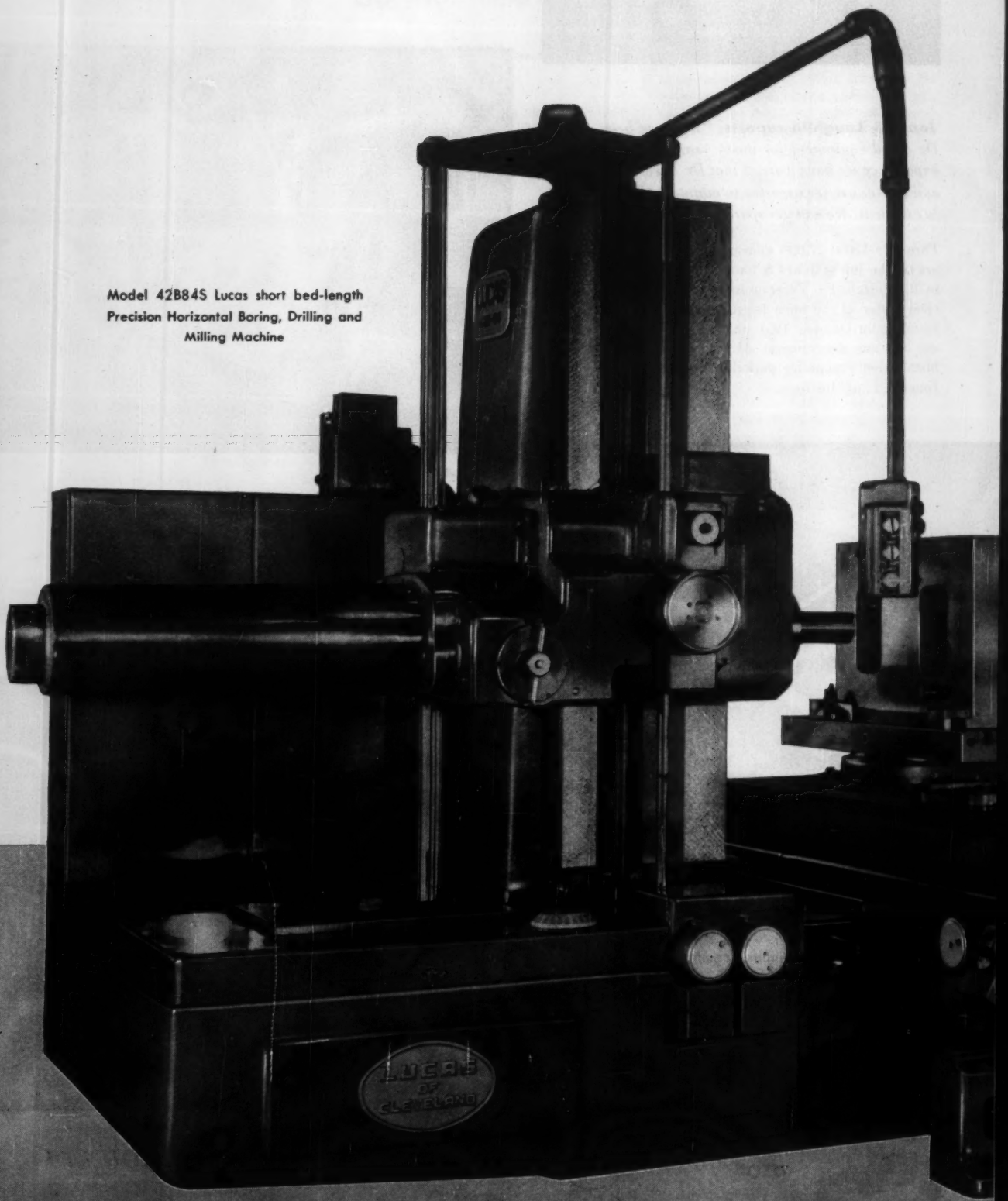
This is one of three De Laval gas exhausters, operating at 48,000 cfm around the clock. Two of these units can handle maximum capacity; the third is used as a spare. Jones & Laughlin says, "Without good gas exhausters you would have to 'bee hive' (open the top and permit the gas to go free), thus losing our by-product."

Send for Bulletin 0504

DE LAVAL *Pumps and Blowers*

DE LAVAL STEAM TURBINE COMPANY
860 Nottingham Way, Trenton 2, New Jersey

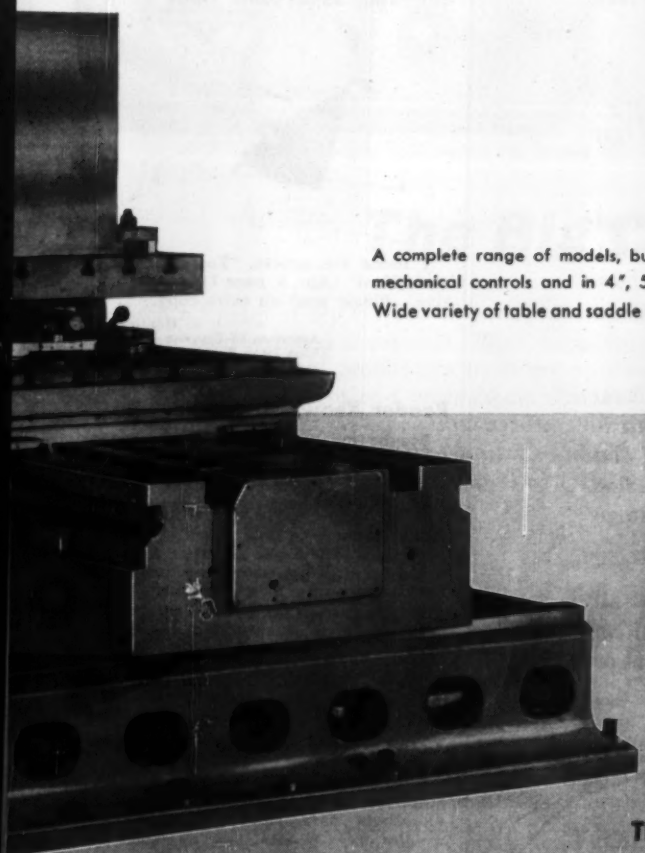
DL 297



Model 42B84S Lucas short bed-length
Precision Horizontal Boring, Drilling and
Milling Machine

more Lucas in less space

This new horizontal boring, drilling and milling machine is a space and money saver on work where a backrest is not required. Lucas leads the parade by concentrating all its efforts on horizontal boring machines—by constant improvement, by incorporating every advance immediately. Every worthwhile improvement will be found first in a Lucas. Lucas Machine Division • The New Britain Machine Company, 12302 Kirby Ave., Cleveland 8, Ohio.



A complete range of models, built in 3", 4" and 5" spindle sizes with mechanical controls and in 4", 5" and 6" sizes with electrical controls. Wide variety of table and saddle sizes with two- or four-way beds optional.

LUCAS
OF
CLEVELAND

A DIVISION OF
THE NEW BRITAIN MACHINE COMPANY

PRODUCTION PLATING WITH UDYLITE-SELENIUM

75,000 amperes of Rectification with push-button control

In this ultra-modern automatic plating operation the rectifiers selected were Udylite Selenium—with a total output of 75,000 amperes.

30,000 amperes at 2 to 9 volts are used alone for the nickel plating operation. These selenium rectifiers are controlled automatically by a single push button control. No matter how much work is in or out of the tank, the amount of voltage is automatically adjusted to remain constant.

The chromium plating is equipped with 9 volt selenium rectifiers. Each rack of work goes into the chrome plate "live" at approximately 3 volts. When the racks arrive at the bottom of the down stroke a strike voltage of 9 to 18 volts is applied for a few seconds—then the voltage is lowered to regular plating voltage —and it's all done automatically!

Udylite has engineered hundreds of similar installations of all sizes for all kinds of metal finishing operations. Why not call on this experience for your rectifier problems—either Selenium or Germanium? Write us today.

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

WORLD'S LARGEST PLATING SUPPLIER

LETTERS TO THE EDITORS

Publicity To Avoid Waste

We were impressed with your article, "Saving Dollars in Manufacturing" (Oct. 24, page 104), and are now interested in reducing our manufacturing costs by eliminating waste.

In starting a waste-elimination campaign, we find that we need publicity to get the idea across. We also need slogans to paint on signs, as well as posters. Can you tell us where we can get posters or slogans that may be used?

The "Willie Waste" character is a clever idea. Is he copyrighted?

R. B. Smith
Engineering
Stockham Valves & Fittings
Birmingham

• *The "Willie Waste" character is based on a campaign used at Leeds & Northrup Co., Rockland and Stenton avenues, Philadelphia 44, Pa. We suggest you write to them for help.*

The U. S. Air Force Procurement Office in your area may be able to offer suggestions. Or, write: George L. Conner, Production Specialist, Conservation Office, Philadelphia Air Procurement District, MAAMA, Philadelphia, Pa.

Subduing Supersonic Heat

I found the article, "Taming Supersonic Heat" (Apr. 9, page 112), informative. Please send an extra copy.

J. S. Huntington
Assistant to Division Manager
Utica Drop Forge & Tool Corp.
Utica, N. Y.

Reader Knows His Math

Maybe my night school math is out of date, but didn't you make out a better case for the economics of titanium than is true?

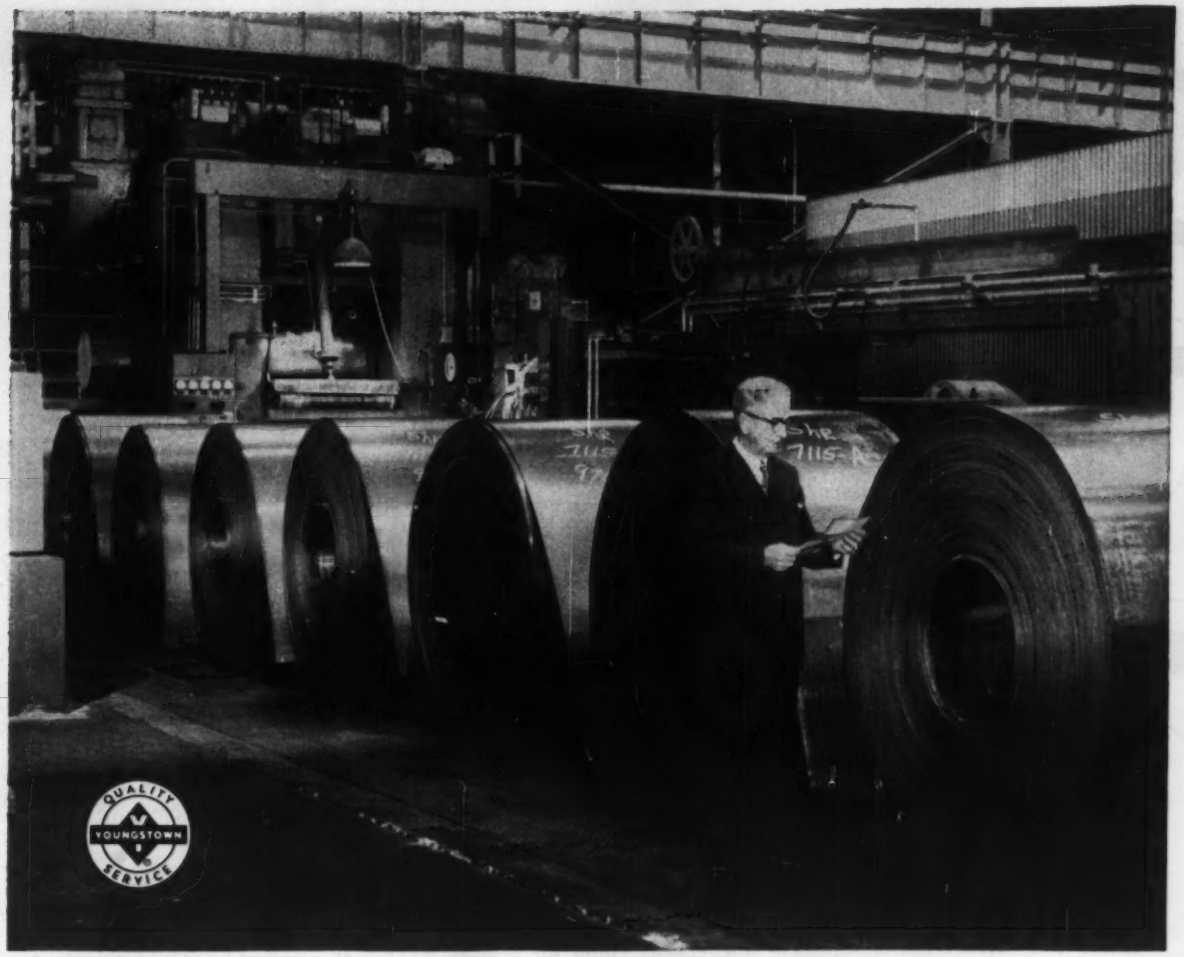
I am talking about the article, "Titanium Hunts Civilian Uses" (Apr. 2, page 55). In it you say that the cost factor for titanium would drop ten times (in comparison with stainless steel) and that a piece of titanium equipment can be three times cheaper than one made from other materials.

C. R. Maxon
Market Development Division
New Jersey Zinc Co.
New York

• *Your night school mathematics have not let you down.*

Two errors occur in the second paragraph of the third column on page 55. It should have read: "But titanium weighs only 56 per cent as much as

(Please turn to page 12)



Large diameter coils leaving the temper mill at our Indiana Harbor Works, East Chicago, Ind.

The Big Coil Lineup

Such a lineup of big coils is an everyday sight in our cold reduced sheet mill. With complete integration of steel production from ore mines to shipping platform and with modern manufacturing facilities, we have unusual flexibility to meet any requirements on cold rolled sheets and strip. Quality control and physical specifications are no problem.

If your operation calls for cold rolled products of close uniformity and unvarying high quality, we would like to talk to you. Telephone the Youngstown District Sales Office near you or write the home office. The earlier we can discuss your requirements, the better we may be able to serve you in the coming months.

Youngstown COLD ROLLED SHEETS AND STRIP

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices Youngstown, Ohio District Sales Offices in Principal Cities.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - BLACK PLATE - RAILROAD TRACK SPIKES - MINE ROOF BOLTS

WAGNER BROTHERS

. . . has 95% efficiency
. . . with 100% protection!

Germanium has no peer for use as a semiconductor in providing an efficient source of DC current. However, germanium is extremely heat sensitive and must be protected against thermal overload and current faults which, if unchecked, would instantly destroy the germanium junctions.

After two years of research and design in collaboration with the General Electric Company, Wagner Brothers is proud to announce their new, *completely protected*, highly efficient Germanium Power Rectifier.

General Electric "Safety Cells" are hermetically sealed to shield the germanium element from moisture and any corrosive fumes. Each "Safety Cell" is individually protected from destructive current faults by fast-acting "amp trap" fuses which break the circuit in a fraction of a second, before the germanium junctions can be destroyed.

Further protection from normal overcurrent and undervoltage input is provided by separate breakers on the main contactor and on the blower motor. A pressure switch guards against thermal overloads in case of blower malfunction.

Now you can have the advantages of efficient germanium power rectification—plus, assurance that current faults and overheating will not cause stack burnout, downtime and expensive repairs.

If you need a dependable source of DC current, write for our portfolio of technical information.

CHICAGO
CINCINNATI
CLEVELAND
INDIANAPOLIS
NEW YORK
ROCHESTER

Wagner
BROTHERS INCORPORATED

433 MIDLAND AVE., DETROIT 3, MICHIGAN

LETTERS

(Concluded from page 10)

steel. On this basis, the cost factor here for titanium would drop to ten times . . . a piece of titanium equipment can cost less than three times as much as one made from other materials."

Quick Check List

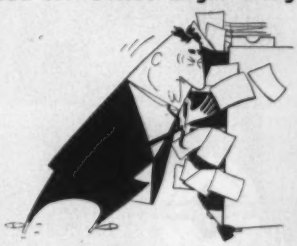
Please send a copy of the report, "Know Your Costs" (Mar. 19, page 83). This is an excellent article on an important subject. The briefs, aside from the proper part of the article, provide a quick check list in reviewing present practices.

R. L. Zobel
Industrial Engineering
Bucyrus-Erie Co.
South Milwaukee, Wis.

This article is exceptionally informative and comprehensive. We would appreciate two copies for reference.

Geo. F. Lee
Cost Control Department
Jeffers Electronics Division
Speer Carbon Co.
Dubois, Pa.

Need for Office Engineering



I have found your article, "Use Office Engineering: Save Money, Time" (Apr. 9, page 76), interesting. Please send a reprint.

Your magazine has proved itself valuable to me.

Lloyd R. Jones
Assistant to Director
of Engineering & Research
Dictaphone Corp.
Bridgeport, Conn.

Ceramic Jigs Interest Reader

We note your reference to ceramic jigs in the article, "Brazing Catches Up" (Mar. 26, page 126). These jigs, you say, are made by Technion Design & Mfg. Co. Inc. What is this firm's address?

V. L. Gensch
Shurhit Products Inc.
Waukegan, Ill.

• *It is: 262 Mott St., New York 12, N. Y.*

More on Expansion

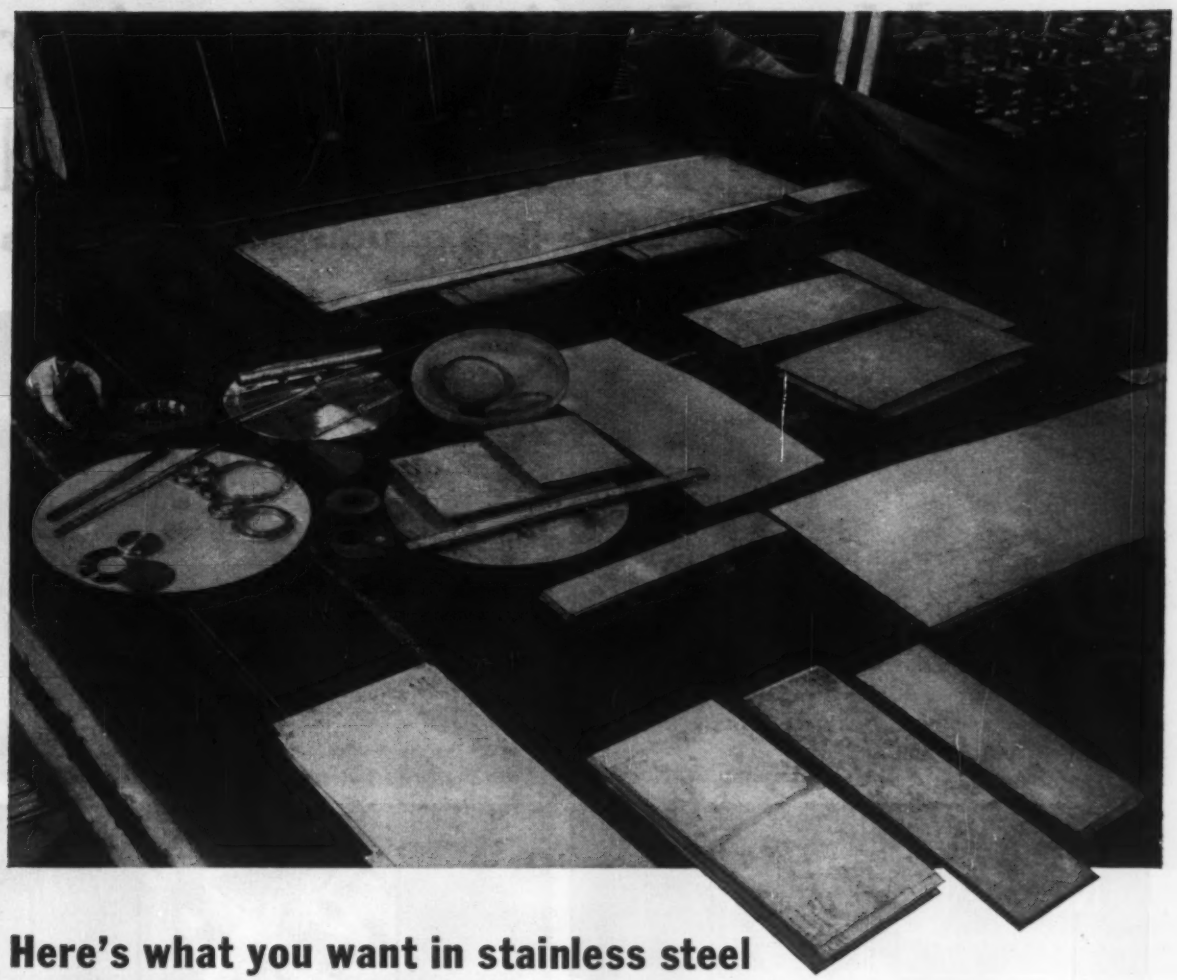
Please forward a copy of your article, "Steel Expansion Goes Ahead" (Mar. 5, page 62).

We are interested in the availability of coke to meet this planned expansion. If you have information, we would appreciate it. The subject of ore supply has been well documented, but we have seen nothing on coke.

May we have permission to use some of the data in the table?

J. R. Forsythe
General Manager
Keystone Coal Buyers Manual
McGraw-Hill Publishing Co. Inc.
New York

• *We are glad to grant you permission to use data from the story.*



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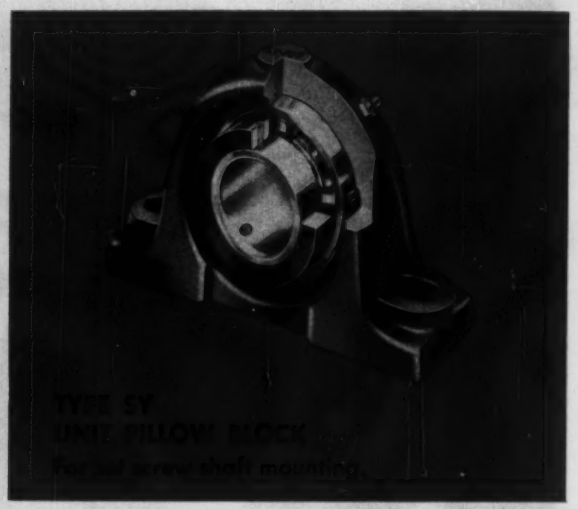

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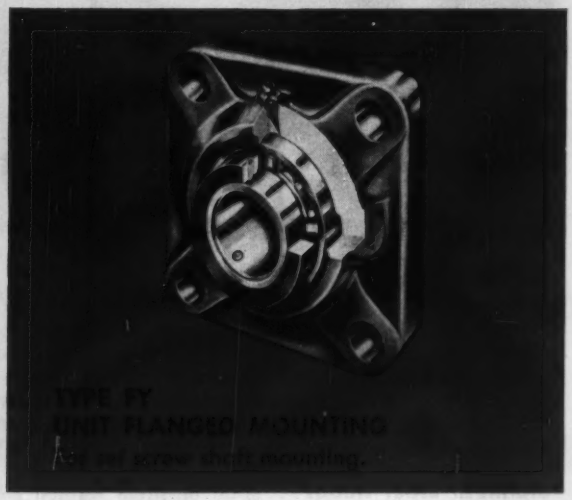
UNIT PILLOW BLOCK
For set screw shaft mounting.

TYPE FY-X
UNIT FLANGED MOUNTING
For eccentric lock shaft mounting.



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For set screw shaft mounting.

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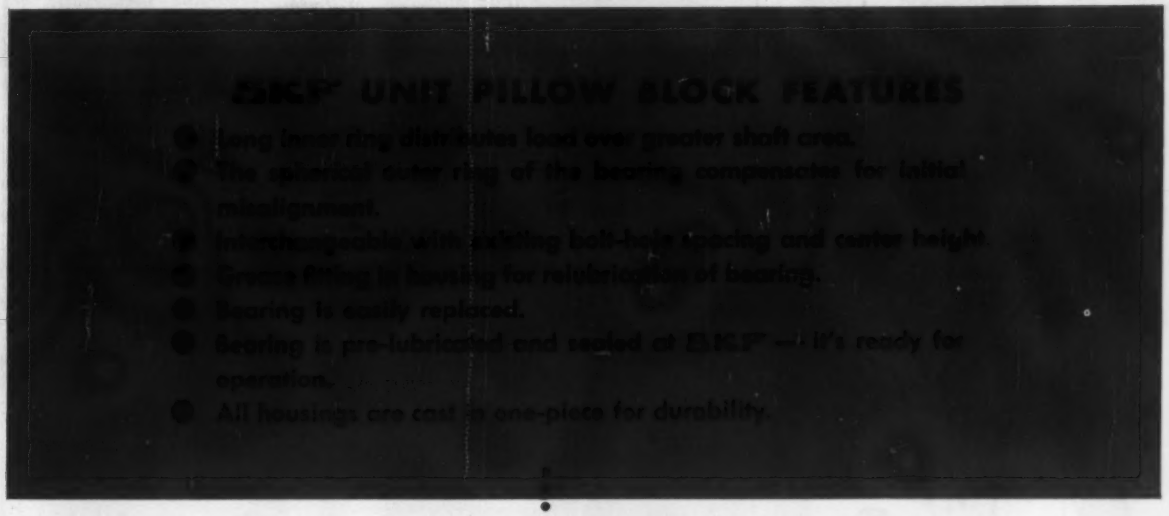

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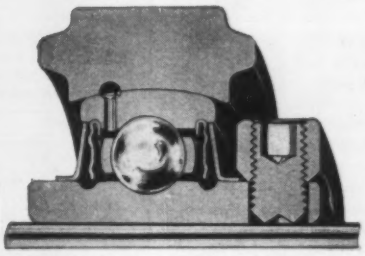

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Tyson TAPERED ROLLER BEARINGS

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WESTINGHOUSE SAVES $18,043 with USS "T-1" STEEL

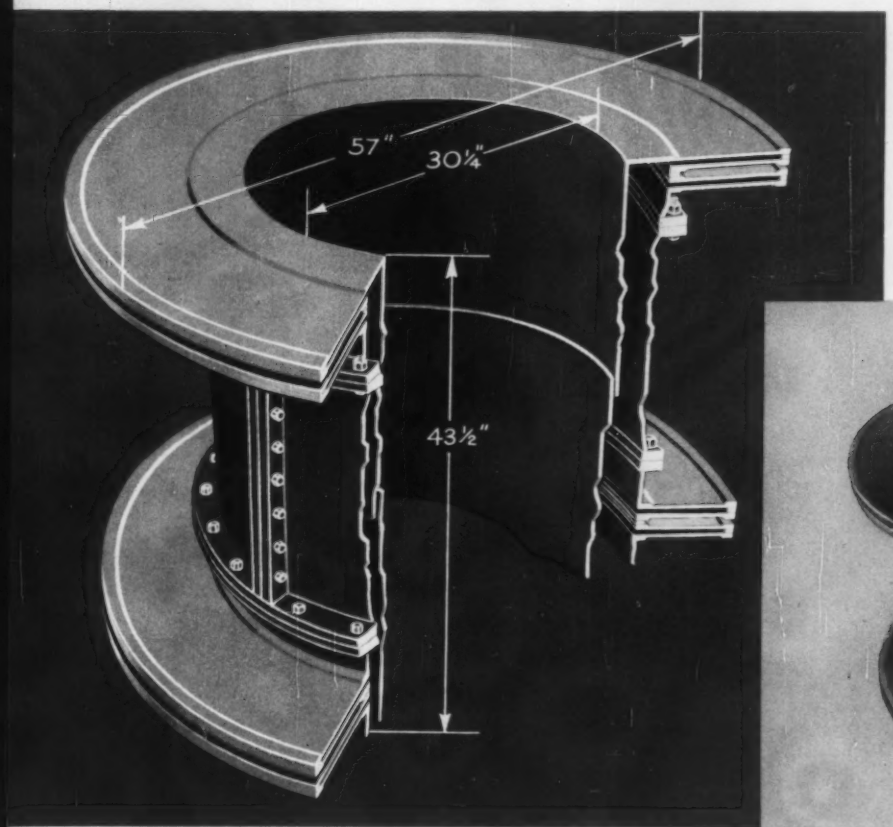
The Sunnyvale, California, plant of Westinghouse Electric Corporation builds unusual expansion bellows and huge wind tunnel air compressors. Steel bellows that flex, both up-and-down and sideways, form a means of effectively accommodating large thermal expansions between the compressor and the foundation. Westinghouse lopped an impressive $18,043 off the cost of these bellows by switching to USS "T-1" Steel.

"T-1" costs less to machine. It costs less to weld. To top it off, "T-1" *costs less to buy* than the steel previously used. Yet it is plenty tough and strong enough to meet the rugged physical requirements.

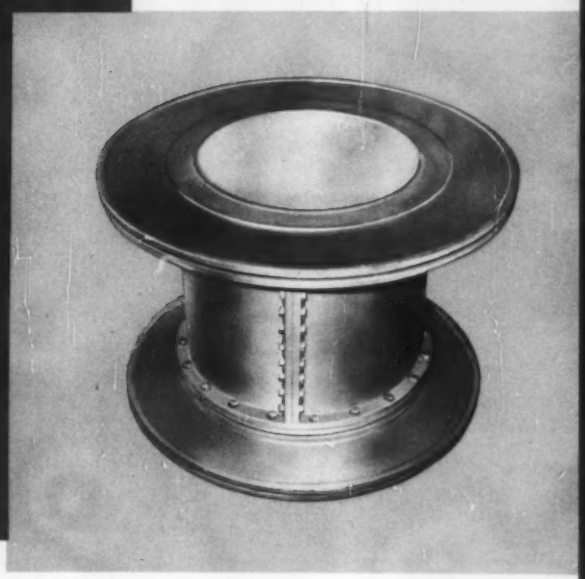
NEW WAYS TO SAVE MONEY

No other alloy steel can be used in *so many ways* to save money or improve products. Already—and "T-1" is still a relatively new steel—it has been used with great success in rotating machines, earth-moving equipment, towers, pressure vessels, mining machines, printing presses, and other heavy-duty applications.

Think of USS "T-1" when *you* need very high tensile strength (105,000 psi.) and yield strength (90,000 psi.) . . . when you need good creep rupture strength at high temperatures . . . extraordinary toughness at sub-zero temperatures . . . resistance to abrasion, impact, and abuse. All or any of these properties, plus good weldability, are yours in "T-1"! For information write to United States Steel, Room 5299, Pittsburgh 30, Pa.



A CUSHION OF STEEL. Here is one of the bellow systems that are used on large wind tunnel air compressors. Two steel bellows at the top and at the bottom of the central cylindrical section flex, both up-and-down and sideways, to provide a means of accommodating large thermal expansions for the huge compressors. Tough, strong steel was needed for the bellows. USS "T-1" does the job better and, at the same time, saves money for the Westinghouse Electric Corporation.



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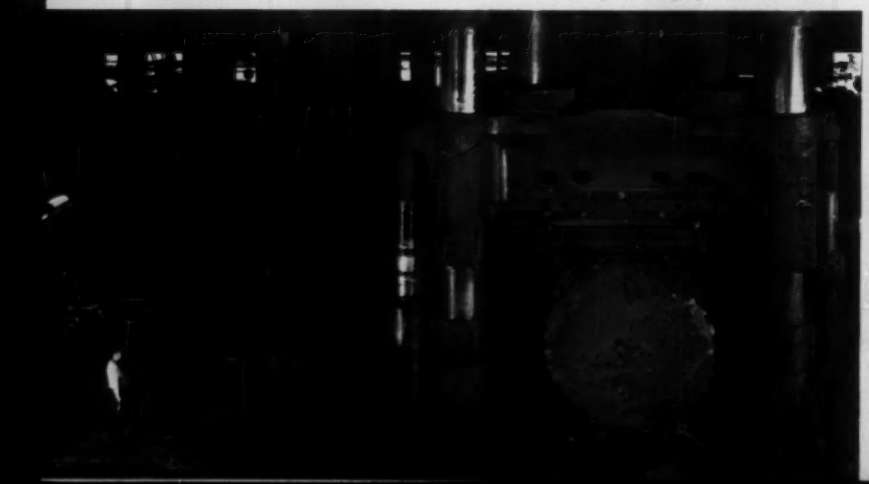
UNITED STATES STEEL

"I think forging is an art"

After about three days of heating, crane takes hot ingot to press.

Preliminary forging.
Basic shape of forging is determined here.



Secondary forging.
This is water wheel shaft for hydro-electric plant.

says **William C. Steele**

U. S. Steel Superintendent of Forging and Heat Treating

Forging an ingot is somewhat like sculpturing a statue by means of semaphore signals that you give to a lurching robot. Using only hand instructions, the forge shop pressman must blend the action of giant cranes, manipulator machines and the press itself. Working only with the immense, blunt dies of the press, he must knead the steel to develop its maximum strength, then squeeze it into the most intricate shapes, frequently to a quarter-inch tolerance.

Truly, this is an Art.

At our Homestead Forgings Division, William Steele has complete charge of the production floor where USS Quality Forgings are forged and heat treated. He has worked in the Division for 28 consecutive years, producing such things as special armor plate, compound-curved wind tunnel parts, hollow sleeves, precision rolls and machinery parts so complicated that you'd never believe they could be forged from a monstrous ingot of solid steel.

If there is any secret to USS Quality Forgings, it lies in our combination of superior steel quality, the finest processing equipment, and most important: skillful, completely reliable men like William Steele.

Please address inquiries or requests for our free 32-page booklet on USS Quality Forgings to United States Steel, Room 5299, 525 William Penn Place, Pittsburgh 30, Pa.

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- Specialty forging of all types

UNITED STATES STEEL

Final inspection. Piece has been heat treated, machined and subjected to dozens of critical tests. Now, it's a USS Quality Forging.

REFRACTORY CONCRETE lining in this forge furnace is made with Lumnite cement. Furnace manufacturers – Champion Blower & Forge Co., Lancaster, Pa.

Tough test for Refractory Concrete

Forge furnaces are tough on refractories because of the extreme variations in temperature and thermal shock due to rapid heating and cooling. Experience has shown that Refractory Concrete made with Lumnite* cement gives excellent service in forge furnaces—also in other furnaces of many types, both large and small. Refractory Concrete has demonstrated its durability under severe temperature and service conditions. With it you can easily place your own refractory installations, and service strength is reached within 24 hours. A convenient way to make Refractory Concrete is with castables. These are packaged mixes of Lumnite calcium-aluminate cement and selected aggregates designed for your specific job, prepared and distributed by leading manufacturers of refractories.

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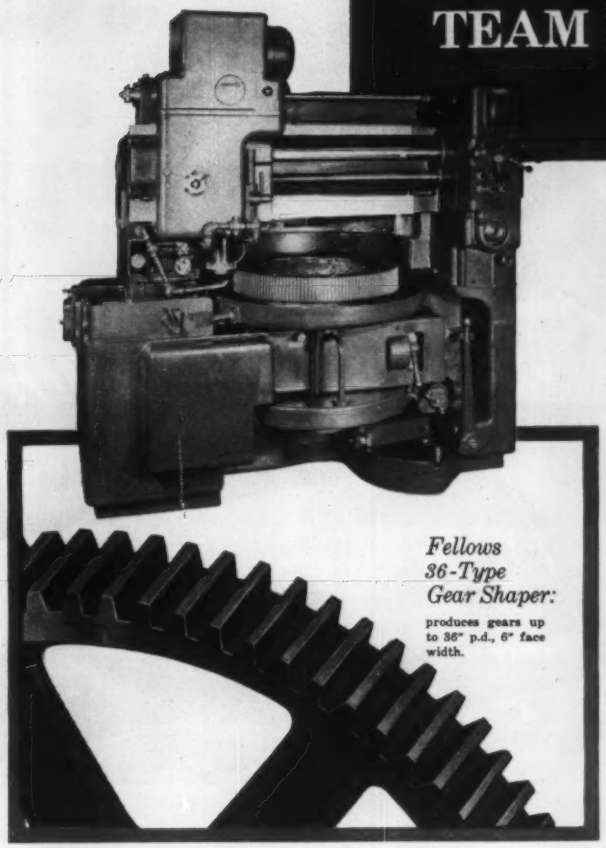
HIGH-PRODUCTION TEAM . . .



Fellows 36-Type Gear Shaper:
produces gears up to 36" p.d., 6" face width.

Fellows No. 4 GS Gear Shaper:
produces gears up to 6" p.d., 2" face width.

. . . to meet your gear-cutting needs up to 36" p.d.

With these two high-speed, close-tolerance machines you can cover the whole range of your spur and helical gear production requirements . . . offering maximum capacity at a reasonable investment.

The new Fellows No. 4GS Gear Shaper finish-cuts internal and external spur and helical gears up to 6" p.d. and 2" face width, at 9 cutter speeds from 98 to 635 strokes per minute! It can be used for general purpose gear cutting or adapted to semi-automatic or completely automatic operation for large production runs. Rigid mechanism assures high speed with close tolerances. Rotary feeds from 0.008" to 0.028" based on 4" p.d. cutter.

The Fellows 36-Type is a powerful machine that can hold close tolerances while taking extra heavy cuts on internal or external spur, helical, or herringbone gears up to 36" p.d. and 6" face width. Cutting speeds from 18 to 300 strokes per minute. Matched to modern needs for fast set-ups and quick, easy adjustments. Versatility permits wide-spread use cutting cams, splines, and special contours, too.

Get full information about this profitable team from your Fellows representative. WRITE, WIRE or PHONE any Fellows Office.

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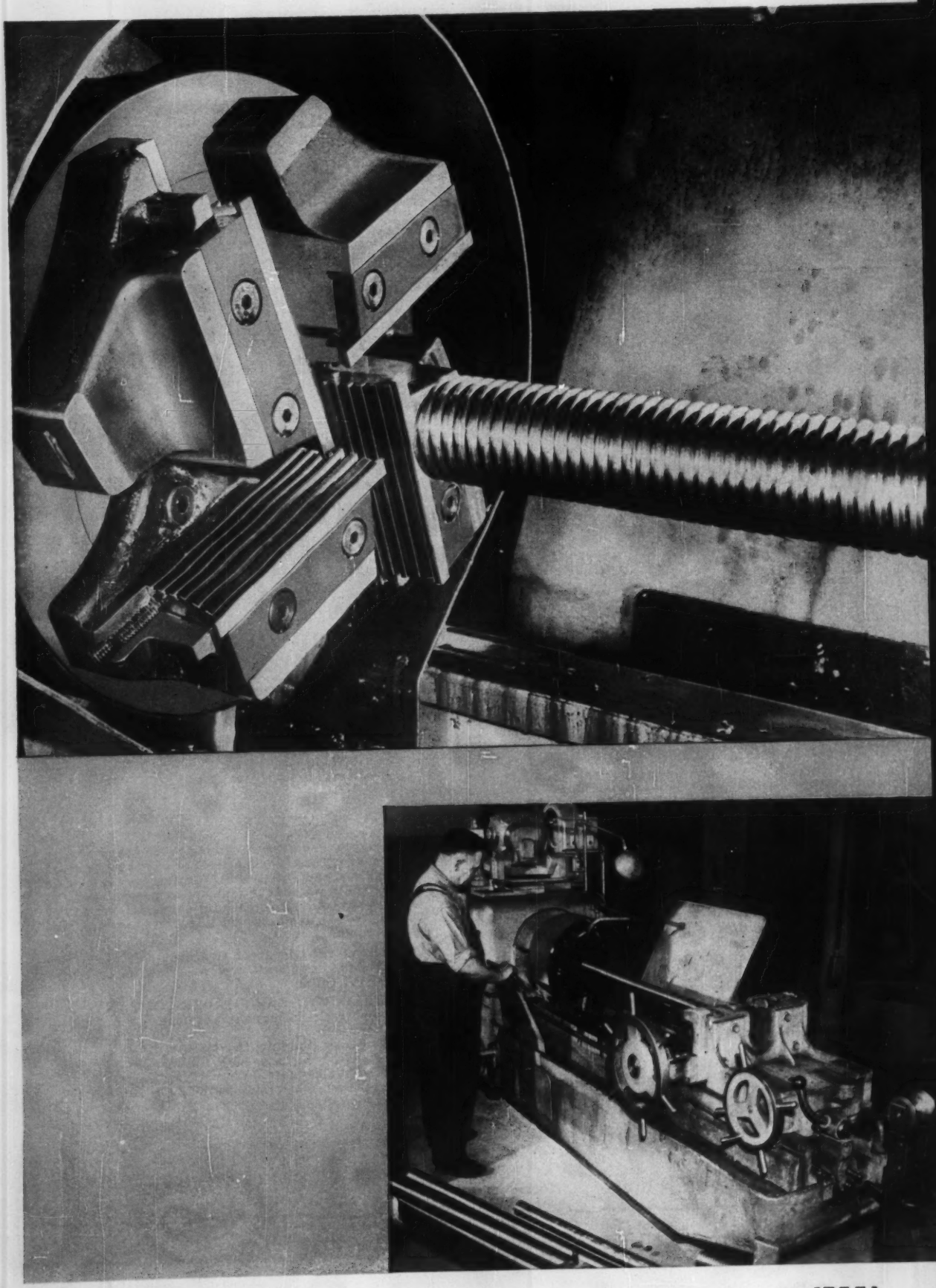
Fellows *Gear Production Equipment*



90%

threading time saved

on power screws

This large saving in the production of power screws at Rodney Hunt Machine Co. (Orange, Mass.) was made possible by the use of a LANDMACO Threading Machine.

Specifications require 2¾" diameter—2½ pitch Acme threads 56" long on cold-rolled steel. 5 hours had previously been required to complete the thread. Floor-to-floor threading time was cut to only 30 minutes after the installation of a LANDMACO 32C Single-Spindle Machine with a special 60" carriage travel.

Many features in the design of this equipment make it possible to do heavy duty threading to precision tolerances. Heavy construction and leadscrew feed assure accurate threading. Slippage of the work is prevented by an improved carriage front with 60% greater gripping power.

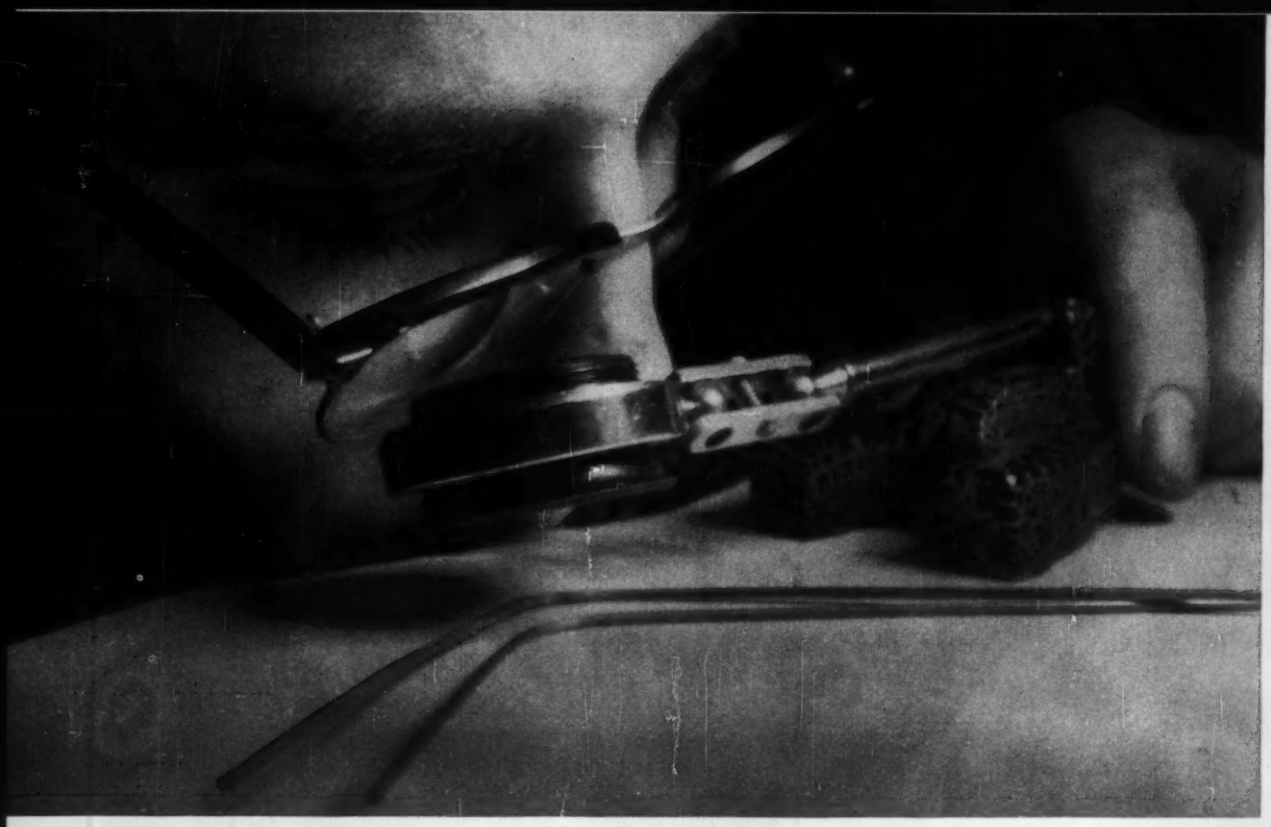
Massive construction of the 4" LANCO head and chaser-holders give maximum support to the chasers for the largest or smallest diameters. The tangential design of the chasers provides lateral absorption of cutting strains and free cutting action. Their roughing-and-finishing form assures threads of excellent finish in one pass, and the centering throats eliminate the out-of-roundness common in long workpieces.

This is but one example of the production economies to be derived from using LANDIS Equipment on large diameter threading. For additional information, please send specifications and ask for Bulletin #*H-45*.

The World's Largest Manufacturer of Threading Equipment - Cutting - Tapping - Grinding - Rolling

LANDIS *Machine* COMPANY

411-C WAYNESBORO • PENNSYLVANIA • U.S.A.



The Connecticut Spring Corp. imposes rigid standards which Johnson Steel & Wire Co.'s Music Wire meets.

They Use Electronics To Build Steel Springs

Connecticut Spring Corporation Uses Johnson Music Wire To Do "The Impossible"

Photo shows 97 springs on a dime with plenty of room to spare, illustrates why The Connecticut Spring Corp. has introduced electronics into production.

What was long considered impossible in the intricate manufacture of precision steel springs—use of electronic production controls—is being done daily in the Hartford plant of The Connecticut Spring Corporation.

Electronics are being used in production of one spring so small that 100 of them fit on a dime easily.

Electronic devices are doing several production jobs for The Connecticut Spring Corp. to protect the company's reputation for quality.

But electronics, as company officials will quickly tell you, only measure quality, not create it.

Quality in a steel spring starts with the wire. That's why Connecticut Spring, one of the largest specialty fine wire users in the East, has been a Johnson Steel & Wire Co. customer since starting business 20 years ago.

"Our experience with Johnson wire has been satisfactory in every respect," says John A. Torda, general sales manager.

Electronic scanning of springs too

(Advertisement)

John Torda, sales manager, left, checks drawings to see that spring being wound meets specifications.

Numerous quality tests are performed on the aircraft spring to insure that it can perform its vital function in plane's fuel system.

Pittsburgh Steel's hard-drawn MB wire is used by Connecticut Spring for cellar door counter balance door spring. Here wire gets two bends.

Three coils are wound into each side of spring. Pittsburgh Steel has been major supplier for this product since production started.

Ready for installation. Tensile strength of wire (Pittsburgh's .218) is vital. Connecticut Spring has no complaints on wire quality.

small to be measured manually is just one precaution the company takes. Its toughest job—a precision compression spring for the carburization system of a reciprocating aircraft engine—illustrates the firm's exacting emphasis on quality.

This aircraft spring weighs only half an ounce but controls the fuel flow in the engine.

The spring is tapered from a top O.D. of 1 inch to a bottom ⅝ inch O.D. Free length is 1½ inches with 8½ coils. Made to Aircraft Material Specification 5112, the spring uses Johnson's .090 Music Wire.

Johnson conducts its own rigid inspection before shipping from its Worcester, Mass., mill to certify the wire meets AMS demands.

Connecticut Spring could get by on this certification. Instead, it conducts its own complete test of physical properties and then trial runs a sample piece of wire from each lot. During production, it runs several inspections, including two load value tests on five different check points.

The aircraft spring goes through heat treating and brazing operations. It must meet precise load specifications, thus its tensile strength must be exact. Specifications permit only one degree of squareness. Load values have a plus or minus tolerance as limited as .003 to .008. A battery of testing devices makes certain these specifications are met or surpassed.

Connecticut buys every size range of Johnson's Music Wire, starting at .003 and going to .300.

For its complete product line, Connecticut relies on both Johnson and its parent Pittsburgh Steel Company. The wire mills of Pittsburgh Steel have become major supplier of hard-drawn MB wire used to make double counter-balance springs for steel cellar doors. Pittsburgh also supplies oil-tempered MB wire for transformer base mounting springs.

Whatever the wire application, Johnson Steel & Wire Company and Pittsburgh Steel Company can serve you. From aircraft cord wire to tire bead wire made by Johnson through oil-tempered, hard-drawn, low-carbon or core wire from Pittsburgh Steel, the team of wire specialists stands ready to serve you. Call in a wire specialist from Johnson or Pittsburgh today for a talk about your wire problems.

Johnson Steel & Wire Company, Inc.

Worcester 1, Massachusetts

***a subsidiary of* Pittsburgh Steel Company**

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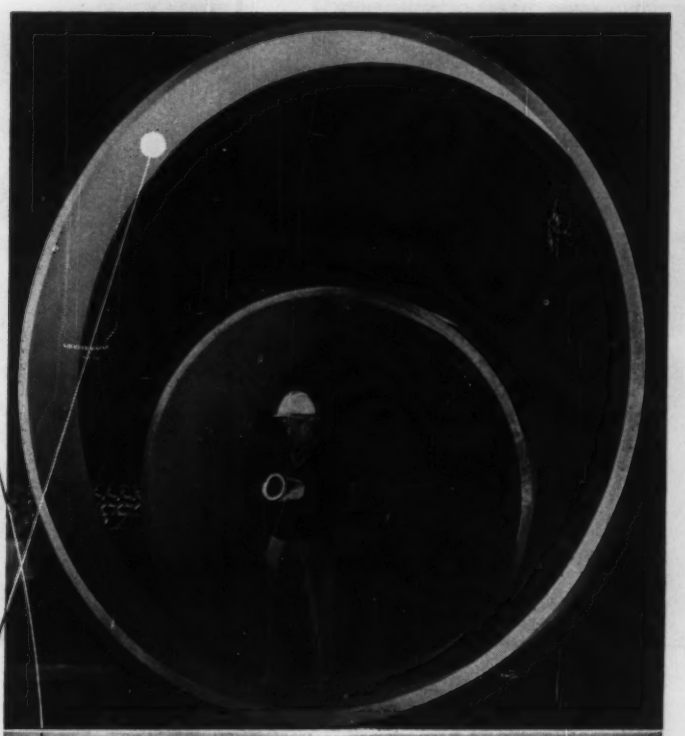
(Advertisement)

Machining time reduced by using Edgewater Rolled Steel Rings



Weldless steel rings of simple or complex cross-sections are readily rolled to close tolerances by Edgewater. The process consists of upset forging of a steel block on a press, followed by the rolling operation, in which powerful mills form shapes such as those shown at the right. Due to the accuracy of the process, a minimum of machining is needed.

Our engineers will be glad to review your requirements and recommend a shape that will best serve you.

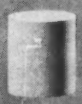
SEND for 12-page bulletin that describes the Edgewater process for making Rolled Steel Rings.

E

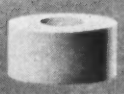
Edgewater Steel Company

PITTSBURGH 30, PA.

how Edgewater Rolled Steel Rings are made:



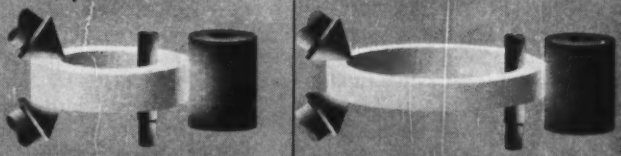
1 A block of steel is sliced from an ingot or rolled bar.



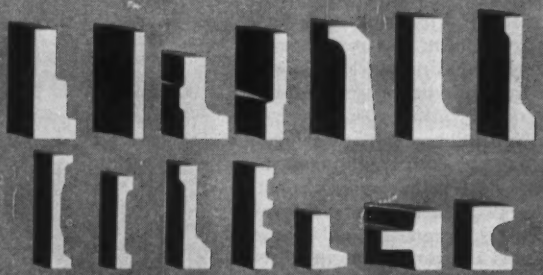
2 After soaking at forging temperature it is upset and punched in a press, forming the "blank."

3 The rolling process enlarges the diameter, reduces the thickness, and forms ribs, flanges, etc., as required.

4 The ring is rolled to accurate shape and dimensions, in one continuous process.



typical shapes rolled by Edgewater



CALENDAR
OF MEETINGS

Apr. 30-May 2, Association of Iron & Steel Engineers: Spring meeting, Lord Baltimore hotel, Baltimore. Association's address: 1010 Empire Bldg., Pittsburgh 22, Pa. Managing director: T. J. Ess.

Apr. 30-May 2, Metal Treating Institute: Spring meeting, Roosevelt hotel, New Orleans. Institute's address: 271 North Ave., New Rochelle, N. Y. Secretary: C. E. Herington.

May 2-4, Industrial Fasteners Institute: Annual meeting, Homestead, Hot Springs, Va. Institute's address: 1517 Terminal Tower, Cleveland 13, O. Secretary: R. B. Belford.

May 3-9, American Foundrymen's Society: Biennial convention and show, Convention Hall, Atlantic City, N. J. Society's address: Golf & Wolf Rds., Des Plaines, Ill. Secretary: William W. Maloney.

May 6-9, American Institute of Chemical Engineers: Spring meeting, Roosevelt hotel, New Orleans. Institute's address: 120 E. 41st St., New York 17, N. Y. Secretary: F. J. Van Antwerpen.

May 6-9, American Steel Warehouse Association: Annual meeting, Fairmont hotel, San Francisco. Association's address: 442 Terminal Tower, Cleveland, O. Executive secretary: Robert G. Welch.

May 6-9, Liquefied Petroleum Gas Association Inc.: Annual meeting and exhibit, Conrad Hilton hotel, Chicago. Association's address: 11 S. LaSalle St., Chicago 1, Ill. Secretary: Arthur C. Kreutzer.

May 7-9, American Mining Congress: Coal convention, Netherland Plaza, Cincinnati. Congress' address: 1102 Ring Bldg., Washington 6, D. C. Executive vice president and secretary: Julian D. Conover.

May 7-11, American Welding Society: National spring technical meeting and welding show, Hotel Statler and Memorial Auditorium, Buffalo. Society's address: 33 W. 39th St., New York 18, N. Y. Secretary: J. G. Magrath.

May 9-11, Investment Casting Institute: Spring meeting and exhibit, New Yorker hotel, New York. Institute's address: 27 E. Monroe St., Chicago 3, Ill. Executive secretary: Harry P. Dolan.

May 9-11, American Management Association: Insurance conference, Hotel Roosevelt, New York. Association's address: 1515 Broadway, New York 36, N. Y. Vice president-secretary: James O. Rice.

May 10-11, Refractories Institute: Annual meeting, Grand hotel, Point Clear, Ala. Institute's address: 1801 First National Bank Bldg., Pittsburgh 22, Pa. Executive secretary: Avery C. Newton.

May 14-15, National Association of Sheet Metal Distributors: Spring meeting, Roosevelt hotel, Pittsburgh. Association's address: 1900 Arch St., Philadelphia 3, Pa. Executive secretary: Thomas A. Fernley Jr.

May 14-16, National Industrial Service Association: Annual meeting and exhibit, Bellevue-Stratford hotel, Philadelphia. Association's address: 818 Olive St., St. Louis 1, Mo. Executive secretary: Fred Wipperman.

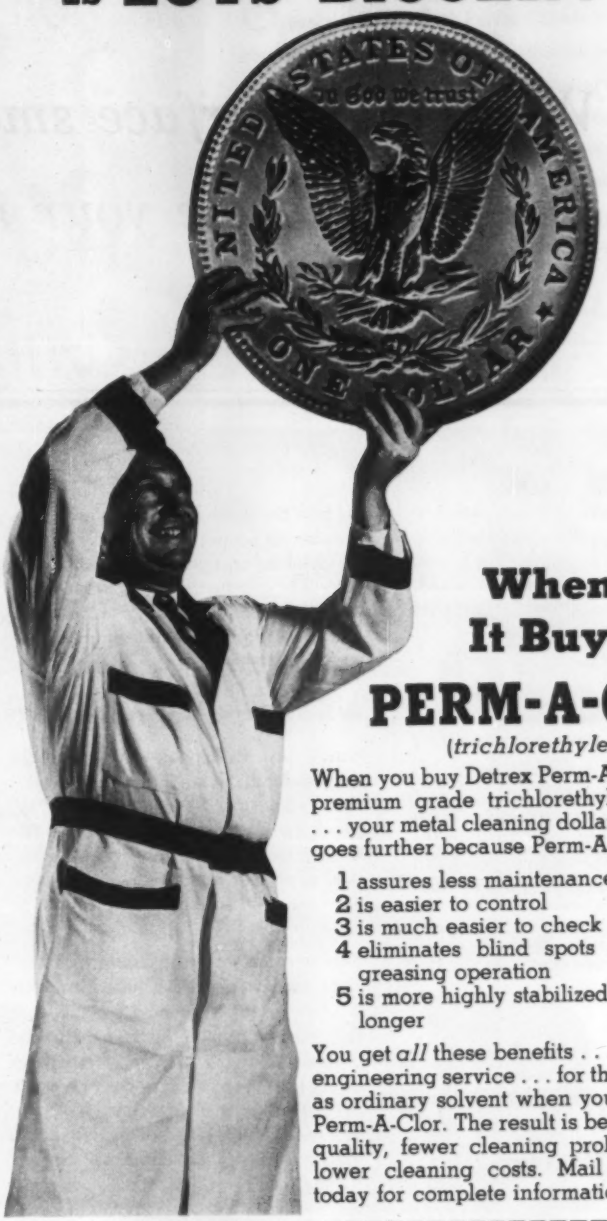
May 14-17, Design Engineering Show: Convention Hall, Philadelphia. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

May 16-18, Anti-Friction Bearing Manufacturers Association Inc.: Annual meeting, Princeton Inn, Princeton, N. J. Association's address: 60 E. 42nd St., New York 17, N. Y. Secretary: H. O. Smith.

May 16-18, Society for Experimental Stress Analysis: Spring meeting, William Penn hotel, Pittsburgh. Society's address: P. O. Box 168, Cambridge 39, Mass. Secretary: W. M. Murray.

May 17-18, National Industrial Conference Board Inc.: Annual meeting and general session for all associates, Waldorf-Astoria, New York. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

Your Metal Cleaning Dollar Is LOTS BIGGER . . .



When It Buys PERM-A-CLOR

(*trichlorethylene*)

When you buy Detrex Perm-A-Clor . . .the premium grade trichlorethylene solvent . . . your metal cleaning dollar is bigger—goes further because Perm-A-Clor:

1 assures less maintenance cost
2 is easier to control
3 is much easier to check
4 eliminates blind spots in your degreasing operation
5 is more highly stabilized, thus lasts longer

You get *all* these benefits . . . plus skilled engineering service . . . for the same price as ordinary solvent when you buy Detrex Perm-A-Clor. The result is better cleaning quality, fewer cleaning problems, much lower cleaning costs. Mail the coupon today for complete information.

☐ Send me complete information on Detrex Perm-A-Clor.

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DETREX CORPORATION Dept. A-101

BOX 501, DETROIT 32, MICH.

DEGREASERS • DEGREASING SOLVENTS • WASHERS • ALKALI AND EMULSION CLEANERS • PHOSPHATE COATING PROCESSES

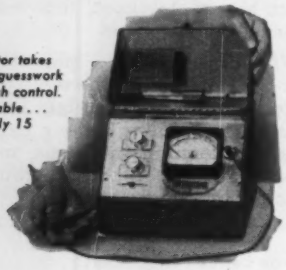
When does surface smoothness begin to waste your money?

In most plants today when a design engineer specifies a certain finish for a part, no one in production knows whether the part will be overmachined, O. K., or too rough until that part reaches the inspection department.

By then it is too late.

The costly consequence is that the company loses money on every part finished too well, AND on every reject resulting from underfinishing. Surface finish begins to waste your money at two precise points . . . *the moment you finish a part a single microinch better than the job requires, and the moment you finish a part a single microinch worse than required.*

Surprising as it may seem, most in-process checking today consists of judging how the finish *looks* and how it *feels* because no accurate, portable, in-process checking equipment has been available. The production department had no tool that could instantly tell the machine operator when he had met the specification.



The Brush Surfindicator takes the costly guesswork out of finish control. Fully portable . . . weighs only 15 pounds.

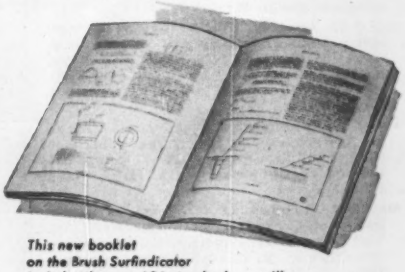
What has been done?

Brush has developed an amazingly rugged electronic surface measuring device called the SURFINDICATOR* which can be carried anywhere in the shop to obtain an instantaneous, accurate in-process measurement of roughness on any surface – flat, round or inside-a-hole.

Now you can set up optimum specifications for surface finish based on your laboratory or pilot model tests . . . and then hand a reliable instrument to the production department to help them meet those specifications with no waste of worker or machine time. You can mount SURFINDICATORS at each machine or set up checking stations throughout the plant. And your regular machine operators can use them . . . it doesn't take an expert.

How It Works

All the user does is pass the stylus over the surface in question and take a direct reading. It's simple, fast, accurate and above all it's practical . . . for metallic surfaces and for glass, porcelain, plastic, paper and other materials.



This new booklet on the Brush Surfindicator includes the new ASA standards . . . will help you establish economical surface finish control.

You should know all about this portable device, its many, many uses and the savings it can mean to your company. We tell the whole story in a new booklet which also includes the new ASA standards on surface finish for industrial use. Write for your copy today on your company letterhead. *T.M.

BRUSH ELECTRONICS COMPANY

3501 Perkins Avenue, Cleveland 14, Ohio

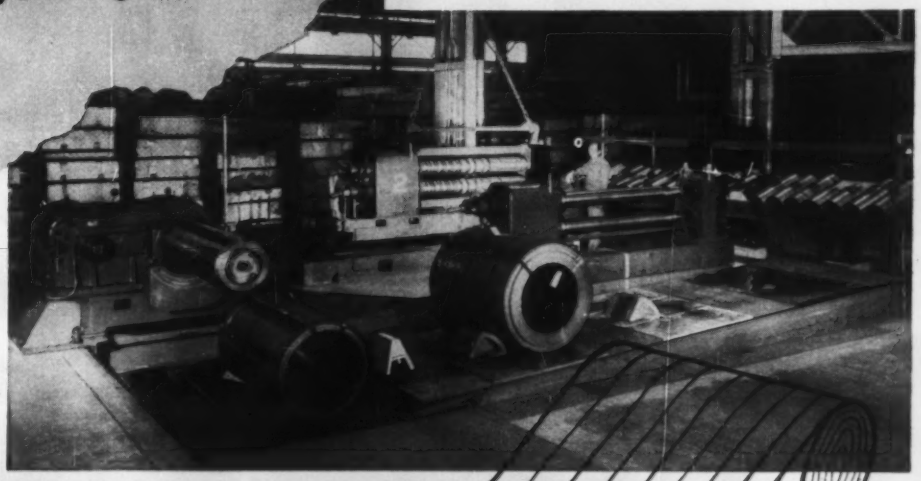
BRUSH 6 ELECTRONICS

DIVISION OF CLEVITE CORPORATION

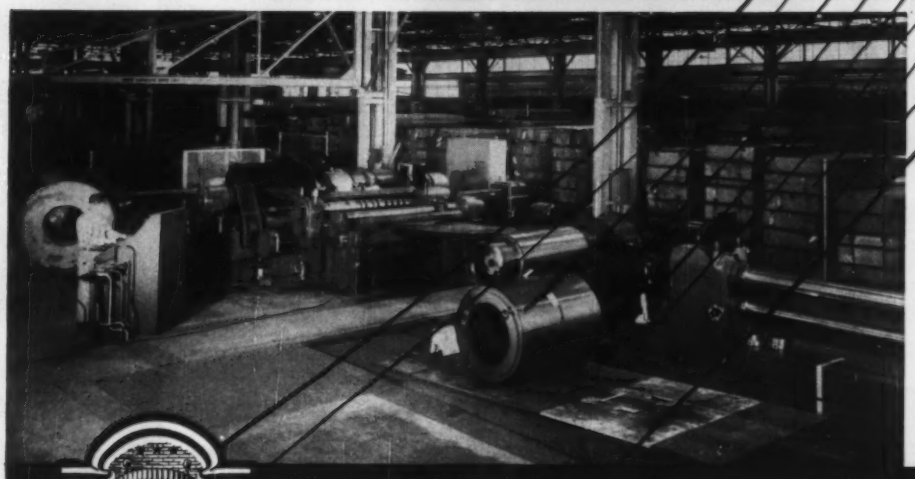
Step Up Production with Stamco Coiling Lines

Stamco Slitting and Coiling Lines will step up your production because they are designed to meet your particular specifications. Years of experience have led to the development of equipment that will meet every slitting and coiling requirement. Stamco slitting and coiling lines are now efficiently handling coils from 500 to 60,000 pounds and are designed to give dependable, maintenance-free service.

Write us, stating your requirements . . . we'll gladly give complete details—no obligation.



View shows coil and traverse, coil pay off reel, coil loading ramp and detachable slitter head.

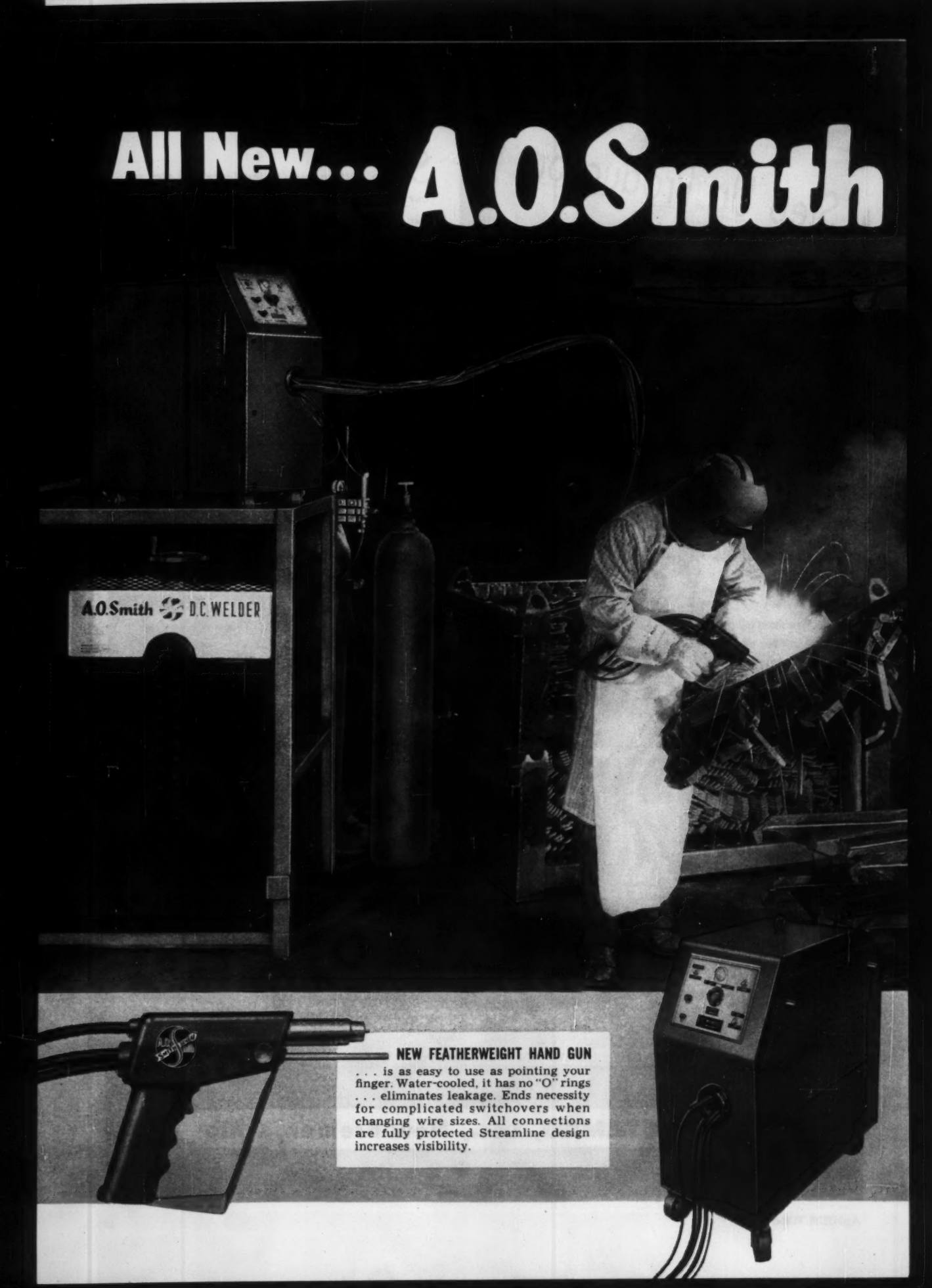


Overall view of coiling line from entrance end.

LAY YOUR SHEARING PROBLEMS AT STAMCO'S DOOR

STAMCO, Inc., New Bremen, Ohio

All New... A.O.Smith



NEW FEATHERWEIGHT HAND GUN

. . . is as easy to use as pointing your finger. Water-cooled, it has no "O" rings . . . eliminates leakage. Ends necessity for complicated switchovers when changing wire sizes. All connections are fully protected Streamline design increases visibility.

C-OMANUAL

Carbon Dioxide Hand Gun Welding

...offers amazing economy and high degree of automation!

★ **Cuts gas cost to practically nothing!**

1¢ per cubic foot for carbon dioxide as compared to almost 7¢ for Helium and 9¢ for Argon... and you use much less. Savings in gas alone will more than pay for your C-OMANUAL unit in several months.

★ **Clean slag-free welds!**

No flux to clean, no chipping, no scraping.

★ **Fast, fast, fast!**

Several times faster than the fastest stick electrodes... as fast, or faster than any semi-automatic process in existence.

★ **Visible arc**

Keeps you in the groove... assures consistent weld quality. Speeds spotting of nozzle.

★ **New simplicity of operation**

There's no constant fiddling with settings. Console automatically controls arc length... compensates for operator's arc distance variations.

★ **Deeper penetration**

Assures sound, uniform welds with excellent strength and ductility.

SEEING IS BELIEVING — Try C-OMANUAL yourself at the AWS Show, A. O. Smith Booth No. 90. For complete facts and information on availability, contact your man from A. O. Smith.

COMPACT, EASILY PORTABLE CONTROL CONSOLE

Mounted on free-rolling rubber casters, the control console is easy to move from spot to spot. It contains wire reel, feed and speed controls, easily traced electrical circuits and all gas and water connections — *plus the exclusive two-speed head* which allows operator to get proper feeds for light or heavy wire by mere flick of selector switch. Controls on front panel are conveniently grouped, easy to read.

Through research ... a better way

A.O.Smith

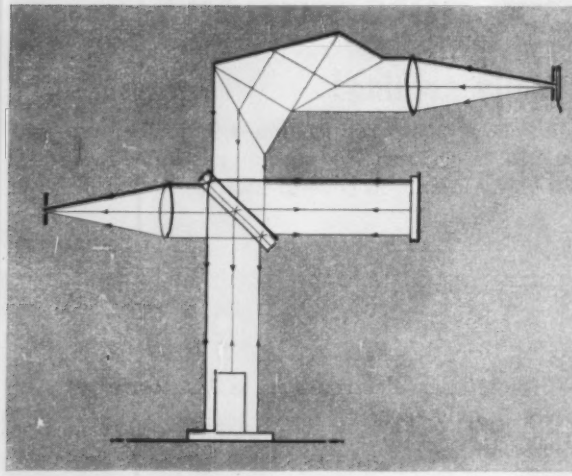
CORPORATION

WELDING PRODUCTS DIVISION

Milwaukee 1, Wisconsin

INTERNATIONAL DIVISION: Milwaukee 1, Wis.

A NEW DIMENSIONAL AUDITING SERVICE FOR INDUSTRY



A Standards Laboratory—America's first commercial dimensional Standards Laboratory has just been dedicated in Dayton by The Sheffield Corporation.

The Eli Whitney Metrology* Laboratory was designed, constructed and equipped in accordance with the experience and standard practices of the great national laboratories of the United States, Great Britain, France and Germany. Thus, this new "Bureau of Standards" is qualified to supplement the work of the governmental laboratories in calibrating and certifying dimensional standards for industry.

Here, also, dimensional audits of precision mechanical components are made—audits not practicable except with the equipment and under the unmatched accurately controlled environment of this Standards Laboratory.

Here, overall dimensional control programs are developed for individual manufacturers—gage surveillance operations worked out in detail.

Here, key personnel responsible for dimensional control can study the philosophy of high precision—can get the feel of high precision equipment and become familiar with the procedures involved.

As to the Laboratory's name—what could be more fitting than to honor that illustrious pioneer, Eli Whitney?

It was Eli Whitney who taught the world the practical value of consistent dimensional precision as the essential of interchangeable parts manufacture.

It was Eli Whitney who thereby introduced our modern era of mass production and economic abundance.

It was Eli Whitney's achievements which demonstrated the blood relationship between dimensional precision and product quality.

The Eli Whitney Metrology Laboratory now takes its place as industry's ally in carrying on this tradition.

For a more comprehensive account of the facilities and capabilities of this unique Laboratory, write for Bulletin ML 1-56. Dept. 17.

Metrology—The science of measurement.

MASTER CRAFTSMAN GOLDEN ANNIVERSARY HEADQUARTERS

SHEFFIELD

Manufacture and Measurement for Mankind

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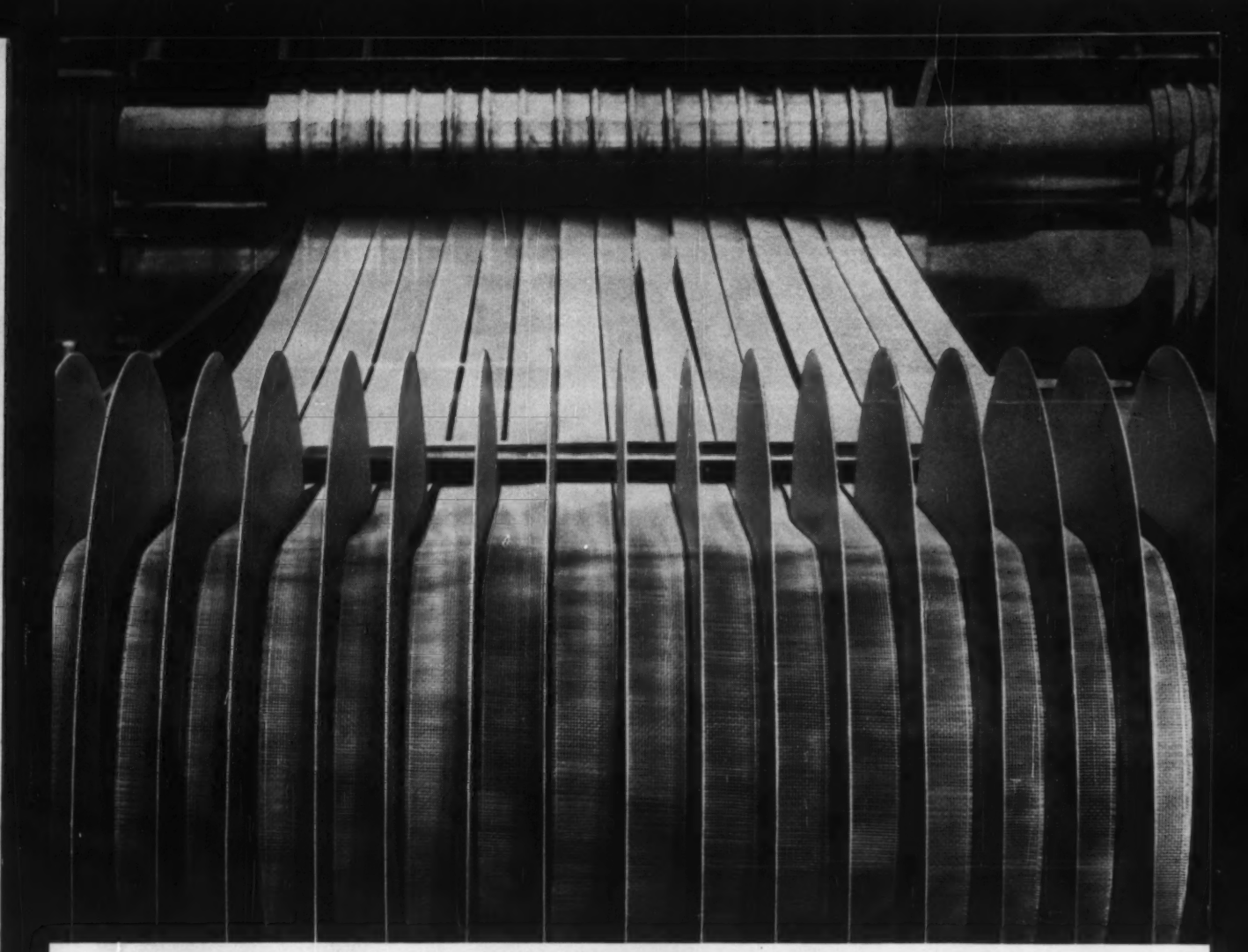


HOW WE GO TO ANY LENGTH...OR WIDTH...
to help you save money on wire cloth components!

● Wire cloth users are experiencing a couple of new reasons why it pays to do business with the Reynolds Wire Division of National-Standard.

Here's the idea. . . .

In blanking or forming wire cloth components, a roll of wire cloth 2 to 8 times normal length means 2 to 8 times as much production in a single run without a shutdown. It also means less waste and less handling!

Similarly, when cloth is pre-slit (as shown above) to exactly the width a customer really needs, this too results in less waste, faster production and reduced handling.

So these days Reynolds Wire is departing more and more from old established industry standards . . . producing wire cloth in continuous lengths up to 800 feet instead of standard 100-foot rolls . . . and furnishing pre-slit cloth as narrow as 1 inch wide and even less.

Why not talk with Reynolds about your wire cloth needs? If we can help you cut production costs you'll be ahead on *every* count... for there's no better, more uniform wire cloth than that you can get from Reynolds. Try us.

NATIONAL-STANDARD COMPANY • NILES, MICHIGAN
Tire Wire, Stainless, Fabricated Braids and Tape

ATHENIA STEEL DIVISION • CLIFTON, N. J.
Flat, High Carbon, Cold Rolled Spring Steel

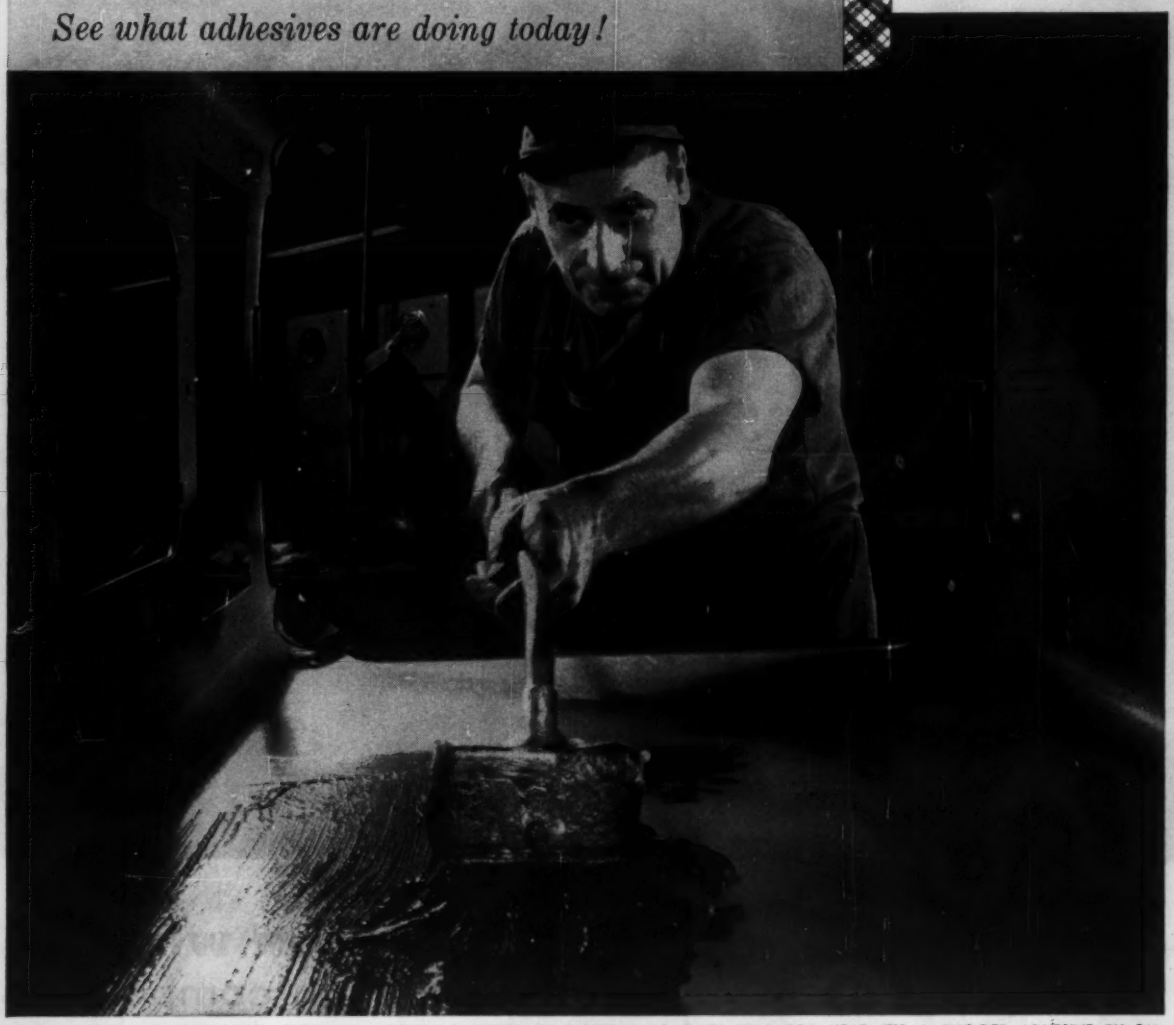
REYNOLDS WIRE DIVISION • DIXON, ILLINOIS
Industrial Wire Cloth

NS
NATIONAL-STANDARD Company
NILES, MICHIGAN

WAGNER LITHO MACHINERY • JERSEY CITY, N. J.
Special Machinery for Metal Decorating

WORCESTER WIRE WORKS DIVISION • WORCESTER, MASS.
Round and Shaped Steel Wire, Small Sizes

See what adhesives are doing today!



OUT OF THIS WORKER'S BRUSH FLOWS A MODERN FASTENER THAT SETS A TOUGHER TRAP FOR HEAT. IT'S A RUGGED ADHESIVE BY 3M.

Inside man for the engineer

This man was trained for one hour. Now he's an expert at adding to the quality of the incinerators his company makes. The 3M adhesive he applies helps build them more durably and economically. *Naturally this adhesive is the product engineer's favorite.*

EC-321 fastens fibrous glass insulation inside the outer cabinet. Despite repeated heats up to 350°F., it holds the insulation tight, guards incinerator efficiency. Since this company switched to 3M Brand adhesive, the product engineer can't recall one single complaint of adhesive failure.

What's more, EC-321 eliminates the hot spots, weld marks and half the labor of former methods.

Hundreds of other 3M adhesives serve industry in a thousand varied uses.

SEE WHAT ADHESIVES CAN DO FOR YOU!

To boost product quality and cut costs, consult 3M research. Contact your 3M Field Engineer. For a free booklet and more information, write: 3M, Dept. 304, 417 Piquette Ave., Detroit 2, Michigan.

PRODUCT OF 3M RESEARCH

3M ADHESIVES

ADHESIVES AND COATINGS DIVISION, **MINNESOTA MINING AND MANUFACTURING COMPANY**

417 PIQUETTE AVE., DETROIT 2, MICH. • GENERAL SALES OFFICES: ST. PAUL 6, MINN. • EXPORT: 99 PARK AVE., N. Y. 16, N. Y. • CANADA: P. O. BOX 757, LONDON, ONT.

MAKERS OF "SCOTCH" BRAND PRESSURE-SENSITIVE ADHESIVE TAPES • "SCOTCH" BRAND SOUND-RECORDING TAPE • "SCOTCHLITE" BRAND REFLECTIVE SHEETINGS • "3M" ABRASIVE PAPER AND CLOTH • "3M" ADHESIVES AND COATINGS • "3M" ROOFING GRANULES • "3M" CHEMICALS

here's proof

This ogive was deep drawn from a sheet of Weirzin.
Photomicrographed cross sections from ogive are magnified 1500 times.

WEIRZIN Electrolytic Zinc-Coated Steel keeps a flawless protective coating even after deepest draws

The edge view cross sections shown above prove that approximately the same thickness of ductile zinc coating remains at the extremity of the draw, 4, as at the base, 1.

That's proof that even during a deep draw Weirzin's tightly bonded coating adheres evenly to its ductile steel base without peeling or flaking, and so continues to provide complete protection against rust or corrosion.

Weirzin is available with or without chemical treatment in coils or cut lengths, in all regular widths and gauges. If you would like specific information on the many ways in which Weirzin may benefit your product, please fill in and mail this coupon today.

WEIRTON STEEL COMPANY
WEIRTON, WEST VIRGINIA
a division of
NATIONAL STEEL CORPORATION

WEIRTON STEEL CO., Weirton, West Virginia

I would like to know more about Weirzin.

My product is_____

NAME_____

POSITION_____

COMPANY_____

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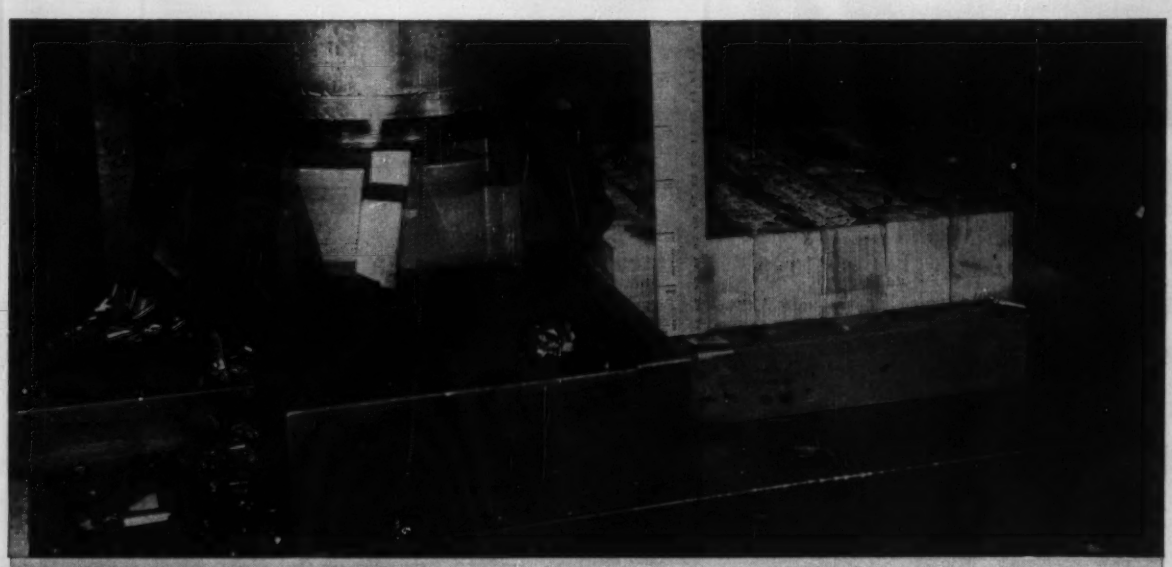
CITY_____ ZONE_____

STATE_____

CARMET®

STEEL-CUTTING CARBIDES

❶ INCREASE PRODUCTION ❷ GIVE UP TO 50% LONGER LIFE



DETAILS OF JOB ILLUSTRATED

Machine	**Sundstrand Rigid Mill**
Cutter Size	**10" Diameter**
No. of Teeth	**12**
Carbide Inserts (grade)	**Carmet CA-610**
Rate of Travel	**400 S.F.P.M.**
Table Speed	**10 in. per minute**
Depth of Cut	**½ inch**
Material	**1095 Cold Drawn Shank Steel, 200 Brinell**

READY FOR YOU

Complete Technical and Shop Data on the Carmet "CA-600 Series" of special steel-cutting Carbides

Write for Your Copy

ADDRESS DEPT. S-762

Here's something *special* for you: the new Carmet steel-cutting grades of carbide, called the "CA-600 Series." One of the grades is shown above in a milling operation—a tough job where the major requirement was continuous production. Cutters equipped with Carmet CA-610 inserts not only increased the production of the machine on this job, but actually gave 50% longer life than the comparable cutting materials previously used.

These heavy-duty CA-600 Carmet grades (premium products in performance, *at no premium in price*) have been thoroughly job-proved in the field. They're available to fit *your* steel-cutting requirements . . . *let us arrange a demonstration of their ability to save time and money for you.* Get in touch with your nearest A-L representative or distributor, or address *Allegheny Ludlum Steel Corporation, Carmet Division, Detroit 20, Michigan.*

For ALL your CARBIDE needs, call

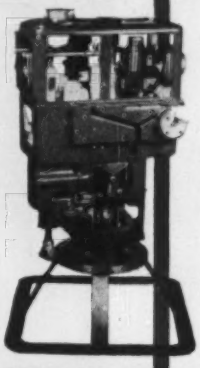
Allegheny Ludlum®

WSW 5344 B

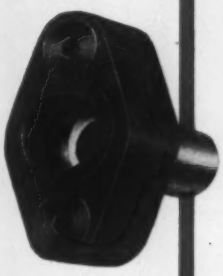
AL
FINE TOOL STEELS
SINCE 1854

5 practical ways to "streamline"

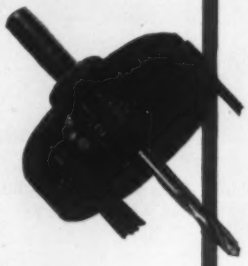
...without sacrificing fastening strength



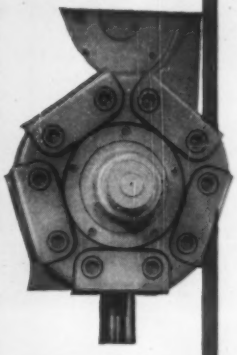
1. Counterbored holes are the simplest approach to flush surfaces using standard socket cap screws. The advantage of specifying genuine Allen O Head Cap Screws is the greater strength of Allenoy steel... you can use smaller sizes for closer spacing and reduced weight. Call on Allen, too, for *very large* socket-head, precision cap screws — up to 2½ inch diameter.



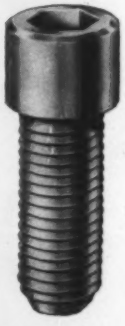
2. Countersinking enables you to get absolutely smooth external surfaces using Allen O Flat Head Cap Screws. Allen O Cap Screws feature the exclusive Leader Point which makes screw starting easier and guards against thread damage.



3. Button Head Cap Screws produce snag-free unbroken surfaces where countersinking is impractical. Button-head hex sockets are necessarily shallow. In genuine Allen O Button-Head Cap Screws, sockets are cold forged without broaching, in extra strength Allenoy steel... essential protection against stripping the sockets under high torque pressure.



4. A ready made hole tapped in forged steel solves many a design problem. It's called the Allenut. It can be anchored in soft material to assure durable threading, or recessed to permit tightening with an Allen Hex Key.



5. Bright finish, or rust and corrosion resistance call for Allen O Stainless Steel Cap Screws. They are standard stocked items (both NF & NC threads) readily available in a wide range of sizes from Allen Distributors.

YOUR ALLEN DISTRIBUTOR can give you practical help and swift service. For complete information on any technical fastening problem, write our engineering department direct.

ALLEN HEAD

ALLEN

MANUFACTURING COMPANY

Hartford 2, Connecticut, U.S.A.

It's not always possible to launder all the chips or filings out of ordinary wiping materials. Chips come back to scar men and metal, to plague your production line. This man has already had four wiper cuts.

He had 4 wiper cuts last month

They're easy to distribute . . .

They really soak up oil . . .

Always a clean one handy . . .

Just toss 'em in the trash . . .

Chips can't hide in a clean Scott Wiper. Each Wiper is brand new, fresh from the carton. A man takes a Scott Wiper as he needs it . . . uses it for his face, his hands, his product.

...He had none!

The difference is . . . Scott Wipers

This is sanitary wiping. A man uses a Scott Wiper thoroughly, throws it away—takes a new one. No danger of cuts from hidden chips . . . no fear of skin infection from dirty wipers . . . when you take a fresh wiper from the carton.

And because Scott Wipers are disposable you save in many other ways. Sorting and baling are eliminated. Handling and distribution are simplified. Laundering becomes a thing of the past.

Put the Scott Wiper through its paces on your production line. Your local Scott representative or distributor is ready to demonstrate in your plant any time you say. Call him or mail this coupon right away.

SCOTT PAPER COMPANY
Dept. W-2, Chester, Pa.
Please send me more information about Scott "Throw Away" Wipers.

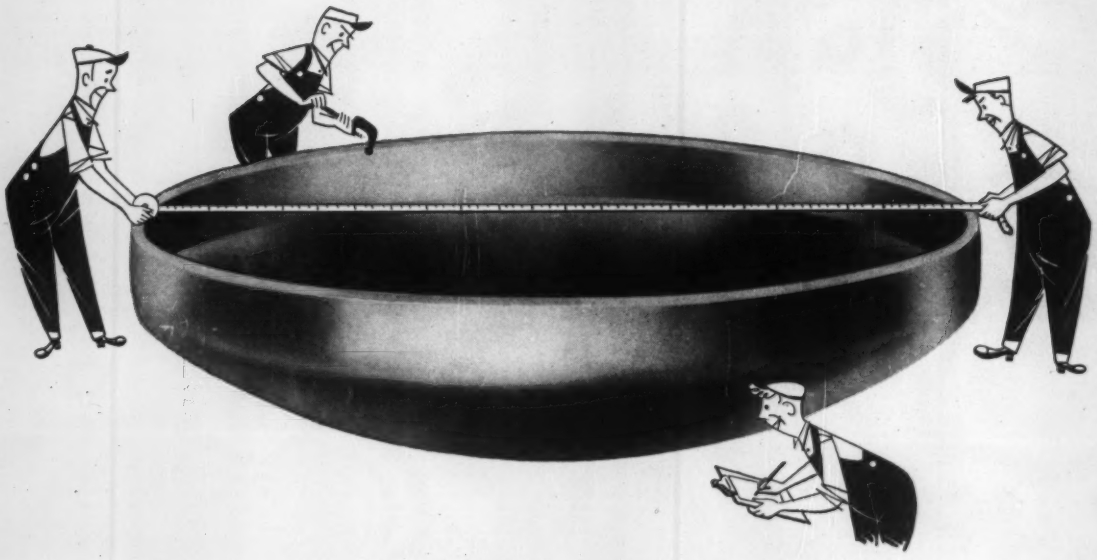
Name_____

Company_____

Position_____

Address_____

CLAYMONT HEADS



made to satisfy the most exacting specifications

Claymont Flanged and Dished Heads can be supplied to meet the specifications of the most exacting fabricator or user. That's because Claymont produces heads in a wide variety of sizes . . . from carbon, alloy, stainless-clad and Lectro-Clad Nickel Plated Steel as well as from non-ferrous metal supplied by our customers . . . and in two classifications:

CLAYMONT SPUN FLANGED AND DISHED HEADS in diameters up to 19 feet. They have long been the favorites of fabricators.

CLAYMONT PRESSED FLANGED AND DISHED HEADS are available in diameters up to 10 feet. Produced on modern equipment, including Claymont's new 3000-ton press, these heads are finding wide acceptance throughout the fabricating industry.

What's more, many of the more popular sizes and types of Claymont Flanged and Dished Heads are stocked throughout the nation in convenient CF&I warehouses. This assures prompt delivery of your head requirements and helps hold your inventory to a minimum.

We'll be happy to tell you how you can use Claymont Flanged and Dished Heads to best advantage in your own operations. There's no obligation on your part, of course, so why not contact us today? Write the nearest sales office or direct to Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P.O. Box 1951, Wilmington, Delaware.

CF&I *Claymont Steel Products* 3714

Products of Wickwire Spencer Steel Division • The Colorado Fuel and Iron Corporation

Abilene • Albuquerque • Amarillo • Atlanta • Billings • Boise • Boston • Buffalo • Butte • Casper • Chicago • Denver • Detroit • El Paso • Ft. Worth • Houston • Lincoln (Neb.) • Los Angeles New Orleans • New York • Oakland • Odessa • Oklahoma City • Philadelphia • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • Seattle • Spokane • Tulsa • Wichita

CANADIAN REPRESENTATIVES AT: Edmonton • Toronto • Vancouver • Winnipeg

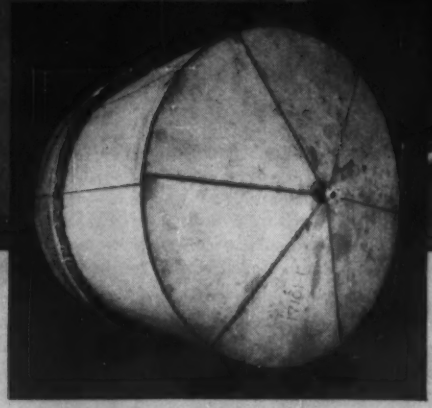
OTHER CLAYMONT PRODUCTS

Carbon and Alloy Steel Plates • Manhole Fittings and Covers • Stainless-Clad Plates • Large Diameter Welded Steel Pipe
Flame Cut Steel Plate Shapes • CF&I Lectro-Clad Nickel Plated Steel

They handle the job faster with

CINCINNATI Shears

at LITTLEFORDS...



Shearing stainless steel for tanks in the Littleford Shops.

Photos courtesy the Littleford Bros., Inc., Cincinnati, Ohio.

"Faster handling—with a high degree of accuracy", say Littleford Bros.

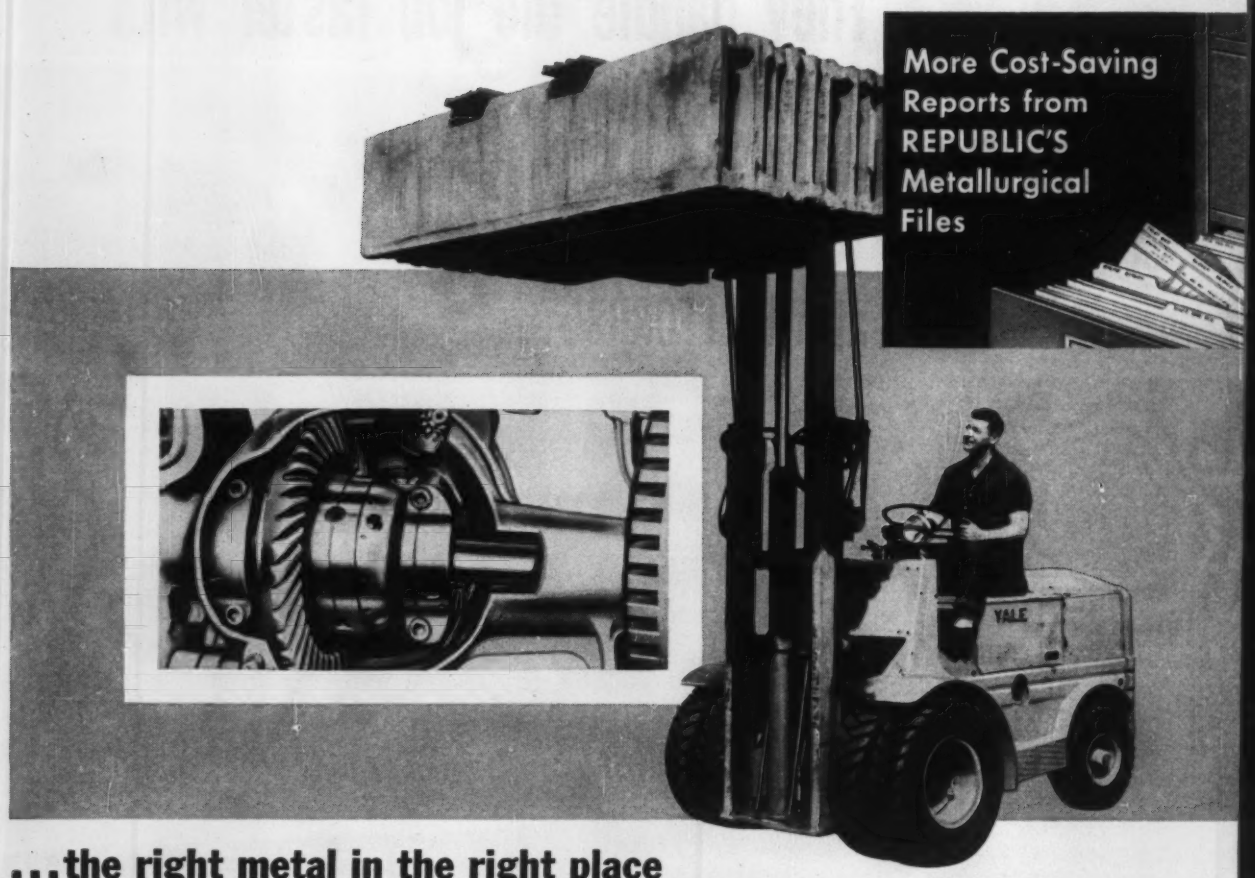
Simple, rapid and positive gauging, with the accurate shearing performance of these Cincinnati Shears—gives a clean cut, economical production, with long knife life and low maintenance.

Write for Shear Catalog S-7

CINCINNATI

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES



...the right metal in the right place

HELPS RAISE LOAD CAPACITY 90,000 POUNDS

At one time, load capacity of lift trucks was restricted to the limits of elevators, usually 2,000 to 10,000 pounds, in multi-storied industrial plants. But with the present trend to one-story plants, the load limit is off.

The Yale & Towne Manufacturing Company, Yale Materials Handling Division, is building lift trucks with capacities as high as 100,000 pounds and using Republic Alloy Steels for vital areas of construction. An outstanding example is the full floating drive axle shown above. The axle, located in the front of lift truck, drives the unit and also bears the full weight of whatever is being lifted.

Prior to the use of Republic 4340 Alloy Steel, this was the part that most frequently failed in service. But, Yale & Towne engineers eliminated this problem by taking full advantage of alloy steel's superior strength and resistance to fatigue, shock and stress.

Republic Alloy Steels provide a combination of qualities essential to designing smaller sections to carry heavier loads with no sacrifice of strength or safety. You will find the highest strength values in these fine steels—plus an exceptionally high strength-to-weight ratio that permits the transmission of hundreds of horsepower through tough, strong axles, shafts and gears free from excess weight.

Add to these qualities a uniform response to heat treatment that produces hard, wear-resistant surfaces around tough cores; and you have a material that insures safety, extends equipment life, and cuts maintenance and replacement costs.

If you have a problem involving any one of these factors, Republic metallurgists and engineers are ready to assist you in the most efficient and economical application of these fine alloy steels to your product. The coupon will get things started.

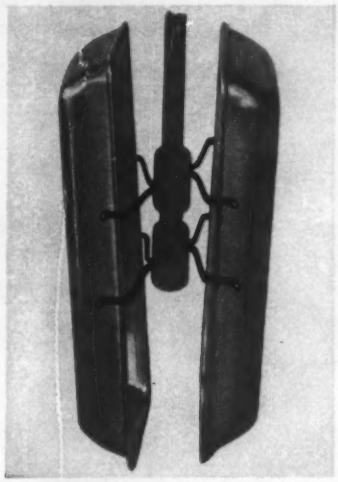
REPUBLIC

REPUBLIC STEEL

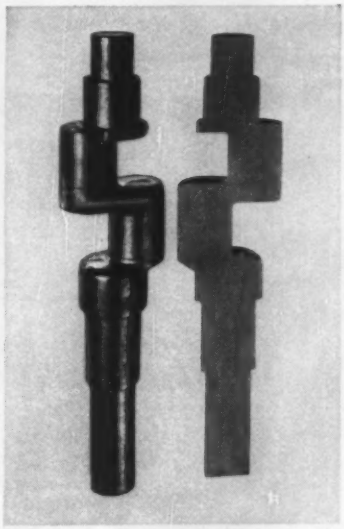
World's Widest Range of Standard Steels

Republic Titanium helps ice tray manufacturer increase anodizing rack life 100 times.

This company formerly used aluminum as rack material for anodizing ice trays and grids. But, its use was expensive and time-consuming. A considerable amount of aluminum dissolved during each anodizing and stripping cycle, and a stripping operation was required to remove anodic film formed for electrical contact on the previous cycle. Then the manufacturer switched to commercially pure Republic Titanium. The result? Rack life increased 100 times. Stripping operation eliminated. Stubborn resistance to chemical attack of cleaning, etching, brightening and anodizing solutions. Republic will help you apply Titanium to parts that must stand up to severe service. Write us.



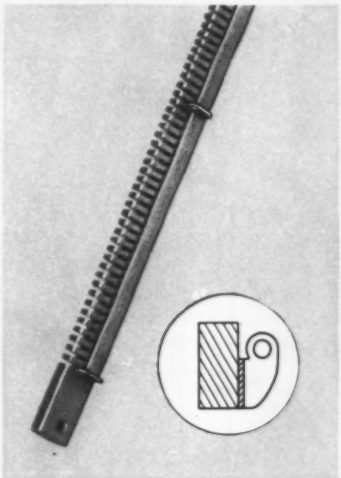
Republic Chateaugay Pig Iron provides excellent surface, dimensional accuracy, uniform grain structure in ductile iron castings.



These two views of a shell-molded, ductile iron crankshaft show the excellent surface and the fine, uniform grain structure of the interior. Unseen is the high tensile strength, wear-resistance and top machinability provided by Chateaugay, Republic's exclusive premium Pig Iron. Chateaugay's high-carbon, low-phosphorus, copper-free content makes it ideally suited to ductile iron use. A Republic Pig Iron Metallurgist will show you, without cost or obligation, how Chateaugay consistently outperforms other pig irons. Check the coupon below if you would like a Pig Iron Metallurgist to call.

Republic Cold Drawn Special Sections cut machining costs on typewriter margin rack.

This part is produced at less cost because most of the machining has been eliminated. The manufacturer uses Republic Cold Drawn Special Sections that are preformed to the predominating cross section of the part. If you produce or design steel parts and are interested in reducing costs, you'll want to know more about these advantages of cold drawn special sections. (1) Almost limitless flexibility in design. (2) One-piece shapes replace costly assemblies. (3) Simplification of built-up, inter-locking or associated parts. (4) Benefits of cold drawing including higher strength, greater hardness, a bright, smooth finish that rarely requires further machining. Made to specification in all grades of carbon, alloy and stainless steel.



REPUBLIC STEEL CORPORATION
Dept. C-1647
3120 East 45th Street, Cleveland 27, Ohio

Send more information on:
☐ Alloy Steels ☐ Titanium ☐ Special Sections
☐ Have a Pig Iron Metallurgist call.

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

STEEL
and Steel Products

GISHOLT

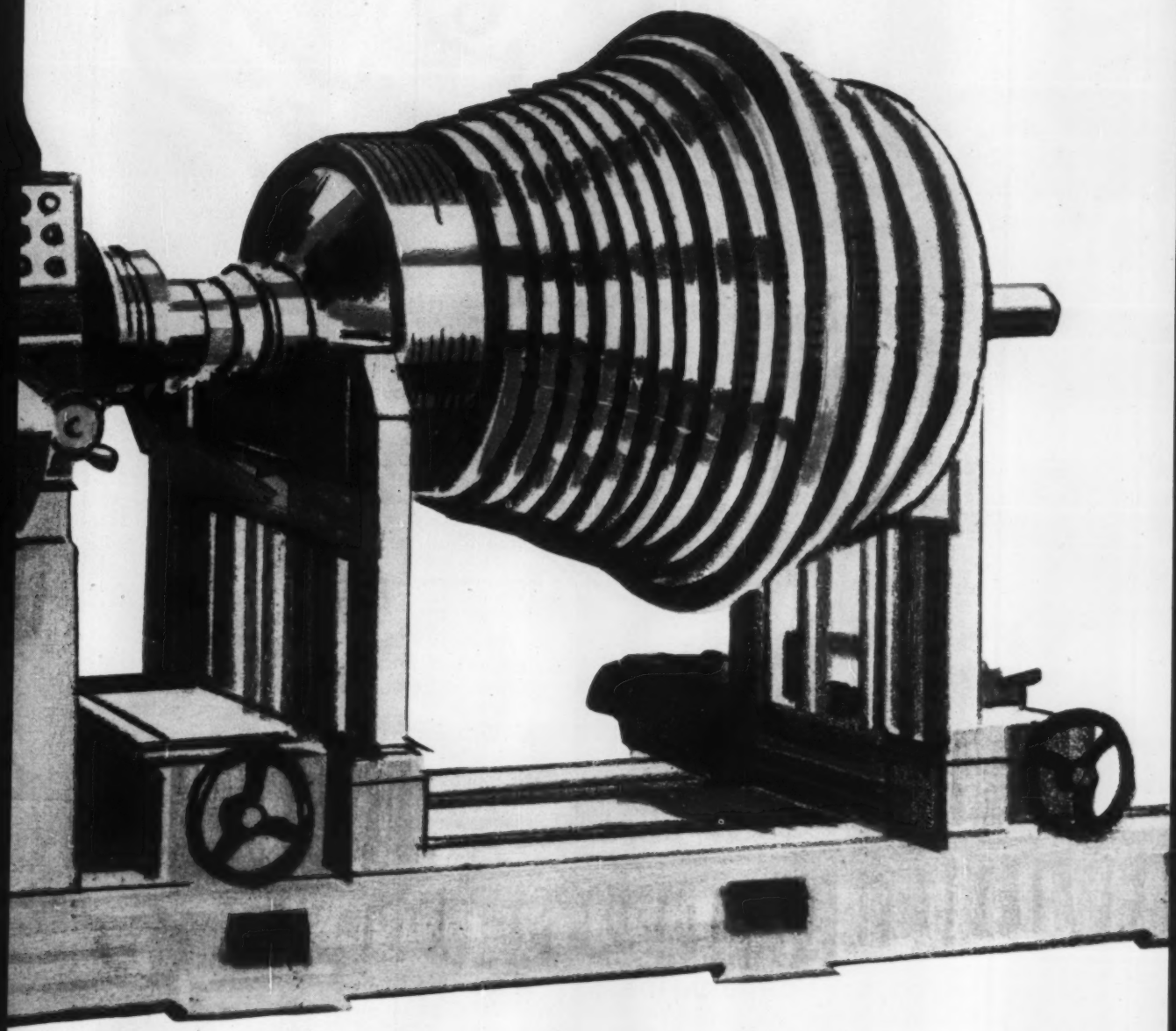
GISHOLT DYNETRIC TYPE "U" BALANCER

MASTERLINE GISHOLT SINCE 1887

This latest design Gisholt DYNETRIC Type "U" Balancer has many outstanding features for quicker setup and faster, easier operation. Unbalance effects are accurately measured and located by unskilled operators. No computation is required—no charts or graphs. In short, here is a truly advanced design for better work at lower cost. If you're interested in the balancing of rotating parts or assemblies, large or small, we would like to tell you about these new machines—and show you how they may be applied profitably to your manufacturing processes.

Gisholt Machine Company, Madison 10, Wisconsin

Look ahead—keep ahead—with Gisholt



in a new car – in a used car –

STAINLESS STEEL
Sells and Re-sells!

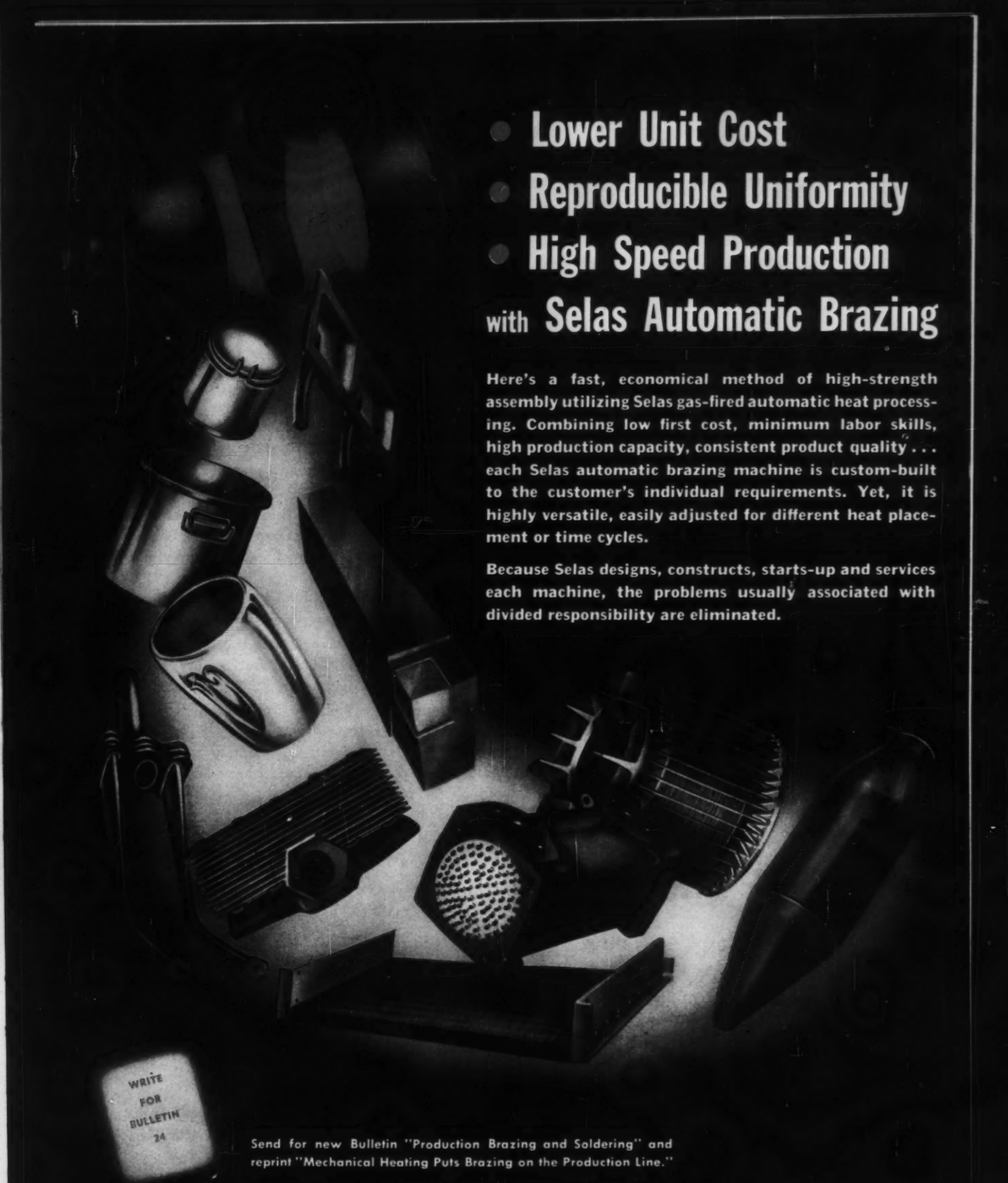
McLOUTH
STAINLESS
STEEL
for automobiles

The Stainless Steel trim, molding and vital parts that add style and beauty to a car, inside and out, are features that help make the sale.

Stainless Steel has wide customer acceptance. It's easy to clean and keep clean. It's a tough, solid metal that will not corrode or dent and stands up to gravel, ice, salt and water.

The finish never fades and parts are easy to replace. Stainless Steel lasts the life of the car. It *sells* in a new car and it *re-sells* in a used car.

McLOUTH STEEL CORPORATION, *Detroit, Michigan, Manufacturers of Stainless and Carbon Steels*



Lower Unit Cost
Reproducible Uniformity
High Speed Production
with Selas Automatic Brazing

Here's a fast, economical method of high-strength assembly utilizing Selas gas-fired automatic heat processing. Combining low first cost, minimum labor skills, high production capacity, consistent product quality . . . each Selas automatic brazing machine is custom-built to the customer's individual requirements. Yet, it is highly versatile, easily adjusted for different heat placement or time cycles.

Because Selas designs, constructs, starts-up and services each machine, the problems usually associated with divided responsibility are eliminated.

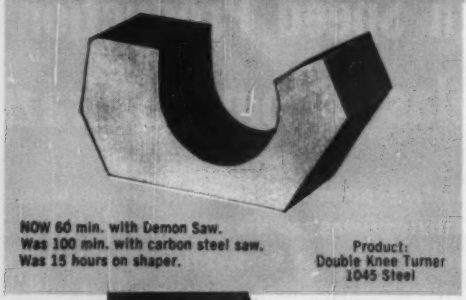
WRITE FOR BULLETIN 24

Send for new Bulletin "Production Brazing and Soldering" and reprint "Mechanical Heating Puts Brazing on the Production Line."

SELAS
CORPORATION OF AMERICA
DRESHER, PENNSYLVANIA

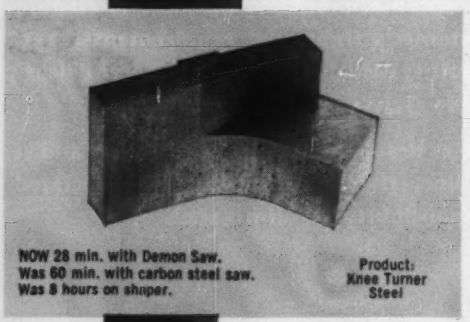
Heat and Fluid Processing Engineers
DEVELOPMENT • DESIGN • CONSTRUCTION

PARTS SHAPED FASTER WITH
Demon
HIGH-SPEED STEEL SAW BANDS



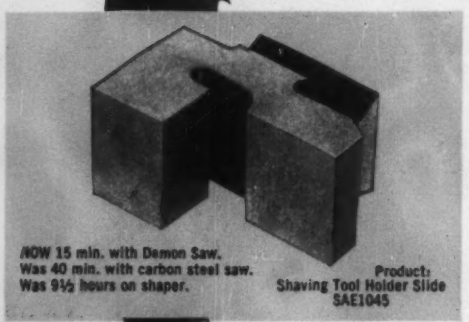
NOW 60 min. with Demon Saw.
Was 100 min. with carbon steel saw.
Was 15 hours on shaper.

Product:
Double Knee Turner
1045 Steel



NOW 28 min. with Demon Saw.
Was 60 min. with carbon steel saw.
Was 8 hours on shaper.

Product:
Knee Turner
Steel



NOW 15 min. with Demon Saw.
Was 40 min. with carbon steel saw.
Was 9½ hours on shaper.

Product:
Shaving Tool Holder Slide
SAE1045

New DoALL Saw Band Shapes Solid Steel Faster Than Any Other Tool

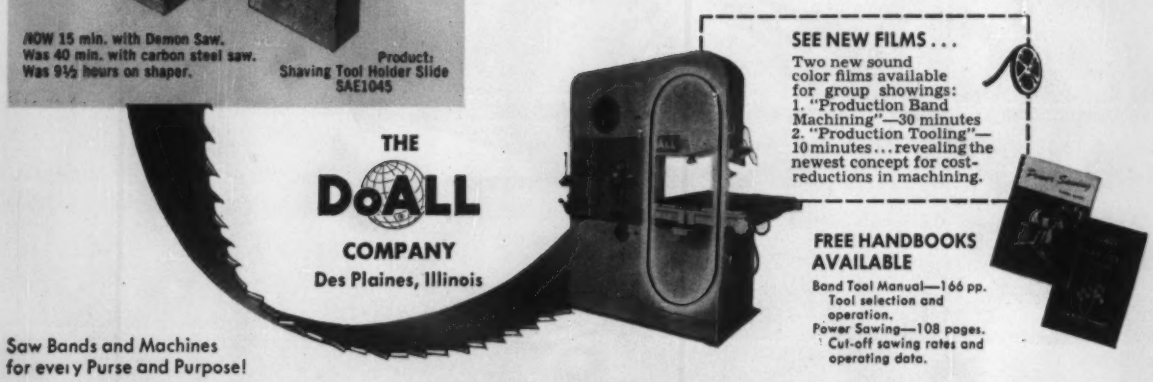
The revolutionary Demon High-Speed Steel Saw Band and its companion, the versatile Contour-matic Band Machine, make it possible to cut critical parts from solid steel or steel forgings faster than has ever been possible before!

DoALL Demon High-Speed Steel Saw Bands slice through the toughest steels up to 10 times faster and with up to 30 times longer life than carbon steel saw bands. This makes the proven world's fastest machining method even faster.

Since the contour sawing method wastes no time making chips out of valuable metal but cuts right to the layout line, removing unwanted metal in chunks, it is possible to maintain high standards of strength and quality in critical machine parts with a decrease in machining cost.

Ask for a demonstration. See Contour Sawing at its best — the DoALL Contour-matic with Demon High-Speed Steel Saw Bands. It's terrific, absolutely amazing and a definite means of making your machining operations more profitable.

Demon and Contour-matic are registered trade marks of The DoALL Company.



THE
DoALL
COMPANY
Des Plaines, Illinois

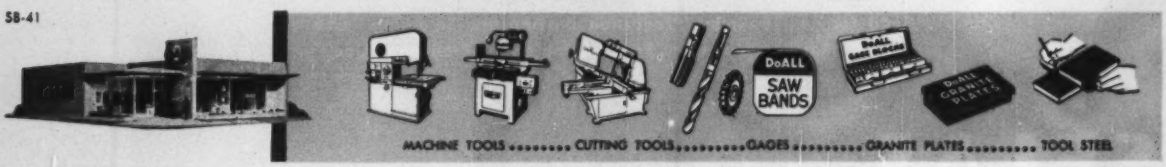
SEE NEW FILMS . . .
Two new sound color films available for group showings:
1. "Production Band Machining"—30 minutes
2. "Production Tooling"—10 minutes . . . revealing the newest concept for cost-reductions in machining.

FREE HANDBOOKS AVAILABLE
Band Tool Manual—166 pp. Tool selection and operation.
Power Sawing—108 pages. Cut-off sawing rates and operating data.

Saw Bands and Machines for every Purse and Purpose!

Free in-your-plant demonstrations—call your local DoALL Service Store

58-41



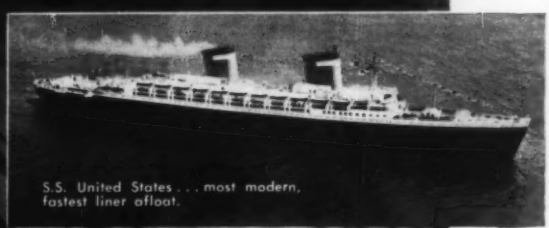
FRIENDLY DoALL STORES IN 38 CITIES give you personalized service and local delivery from complete stocks

Nothing finer!

A statement from
a conservative organization:

"Our records show that when a manufacturer once discovers the uniform quality of Roebling flat spring steel, he becomes a steady Roebling customer."

You, too, *pay* for the best spring steel... make sure you *get* it. Specify Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.



S.S. United States... most modern, fastest liner afloat.

ROEBLING CF

Subsidiary of The Colorado Fuel and Iron Corporation

ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. & 5 PITTSBURGH ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • ROCHESTER, 1 FLINT ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • ST. LOUIS, 3001 DELMAR BLVD • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, 19 RECTOR ST., NEW YORK

Let this "Visiting Fireman" train your men to fight fire . . . it could save your business

You have a *potential* fire-fighting team right in your plant. These would-be fire fighters *could save your business if fire struck unexpectedly*. All they need is training, the kind that will enable them to respond instantly and properly to any kind of fire emergency.

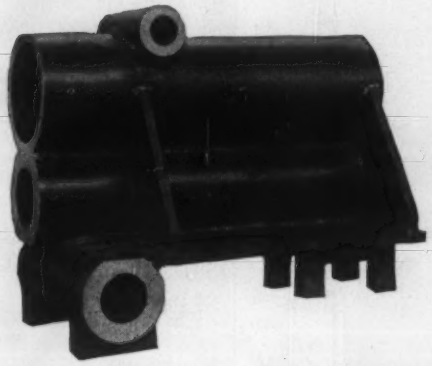
Ansul can provide this training for a group of your men just as it has for hundreds of its customers. And there will be no charge. It is just one of the "essential" services that Ansul provides for its customers.

Twenty years experience in the fire protection industry has proved to Ansul many times over that all the fire equipment in the world will not save your business *unless* trained hands are available to man that equipment. So, it is important to Ansul that you get *training* along with the fire equipment you buy. Only then will you experience the security that goes with having a complete fire protection program. Only then will you get what you really pay for, what you really need—*complete fire protection*.

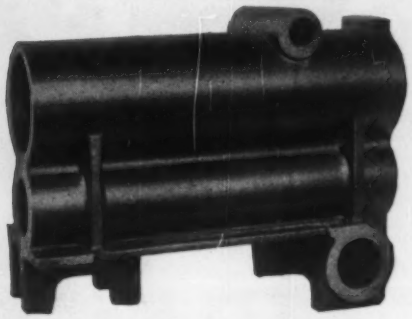
You owe it to the life of your business to learn more about Ansul's in-plant fire training service. Get in touch with your local ANSUL MAN through the yellow pages of your phone directory, he will be happy to call on you and explain all of Ansul's customer services in detail. Or write to THE ANSUL CHEMICAL COMPANY, Dept. S - 4, Marinette, Wisconsin.

ANSUL

Case History No. 35 • SPINDLE HOUSING



Welded $218.57



Gray Iron $109.67

Gray Iron Saves $108.90 Each
INCLUDING PATTERN COSTS!

This symbol assures you the most for your casting dollar

Here's why it pays to call in one of the more than 500 leading foundries displaying the Society symbol:

- The most recent technical and business information is available to each member through the Society to help you design better products at lower cost.
- The use of sound cost accounting procedures is recommended and encouraged among Society member foundries, assuring full value for your casting dollar.
- Improved castings result from the advanced techniques and the high sense of responsibility of Society members.

MAKE IT BETTER WITH GRAY IRON

Ultimate savings on this unit are even higher now that pattern costs are amortized.

Gray Iron castings successfully withstand the severe operational stresses to which this housing is subjected. Also, modern foundry techniques make possible the maintenance of the close tolerances required in this component.

This example of Gray Iron's ability to reduce costs and meet special strength and design requirements is not unusual. Chances are that you will find opportunities in your own products for similar savings with Gray Iron . . . applications where Gray Iron's unique advantages will also contribute to product improvement.

For specific technical or business information about Gray Iron, write direct to Gray Iron Founders' Society, Inc., National City—East 6th Building, Cleveland 14, Ohio.

GRAY IRON FOUNDERS' SOCIETY

Last lap *in fabricating* Monel *into one of the lightest, strongest, longest-lived pickling hooks on the market*

You can see for yourself how this hook is made . . . how thin, light-weight Monel® mill forms can be fabricated into any shape a practical design may require.

You can see, too, the strength of its construction. Monel hooks like this handle big 3-4000 lb. pay loads of coiled wire with strength to spare.

And if you are at all familiar with the history of Monel in pickling service, it's easy to foresee that this hook will have a long life.

In Monel, excellent physical strength and toughness are combined with unusual resistance to corrosion by the common types of pickling solutions. Because of this combination, Monel pickling equipment gives many years of service under even the most severe conditions.

Then after long service, Monel equipment is as easy to repair and recondition as it was to fabricate in the first place.

So look to Monel for minimum deadweight, maximum life pickling equipment. And look to experienced designers and fabricators like Youngstown Welding and Engineering Company to help you realize to the fullest these values of Monel in pickling service.

For information on other pickling uses of Monel, write for the Inco booklet, "5-Way Savings in Pickling."

The International Nickel Company, Inc.
67 Wall Street New York 5, N. Y.

extra life
extra capacity
extra safety

INCO TRADE MARK

Monel
Pickling Equipment

STEEL

April 30, 1956

Metalworking Outlook

Steel Inventories and Labor

Will the steel industry's bargaining position with labor in June be strengthened because of high inventories in steel users' hands? Not much. The high stocks, estimated at between 18 and 20 million tons as of Apr. 30 (see page 59), are primarily in cold-rolled sheets and in auto companies' inventories. Many consumers—structural steel fabricators, freight car builders, to name just a few—still don't have enough steel.

Pensions: Trading Item?

Pension contracts for the steelworkers don't expire until Oct. 31, 1957, but don't be surprised if the pension issue shows up in the coming steel talks. Steelworker President David McDonald wants the ante raised. If a long-term contract is worked out, the steelworkers will argue that it's desirable to have pensions included in the same package. The issue may be a good trading item.

Test for AFL-CIO

A crucial test of AFL-CIO strength is scheduled for tomorrow (May 1). The group's policymaking executive council will consider the legality of the Teamsters' pact with the discredited International Longshoremen's Association. The council has the authority to suspend the Teamsters, a move which AFL-CIO President George Meany will urge. The question is part of the larger problem of racketeering in unions. Focusing increased attention on the matter is the 365-page report (by a Senate labor subcommittee) on fraud and corruption in union handling of welfare and pension funds. Chairmanned by Sen. Paul H. Douglas (Dem., Ill.), the committee documents what it calls "shocking abuses" of fund handling and proposes a new law that would require complete disclosure of facts on all types of welfare plans.

The High Court Rules

Study carefully the implications of two Supreme Court rulings favorable to labor unions. The justices last Monday ruled that an employer can't refuse to recognize a union as a bargaining agent on the ground the labor group has not filed a non-Communist oath and other data with the National Labor Relations Board. And the High Court, in effect, upheld a lower court ruling that the terms of employee stock purchase plans offered by a company are subject to collective bargaining with a union.

Tool Orders Soar

Machine tool backlogs continue to climb. New orders for March hit $95.4 million, reports National Machine Tool Builders' Association. That's 51 per cent above new business signed up in March, 1955, and 10.8 per cent greater than the previous month's new orders. Shipments are up, too—to $74.2 million in March, from $64.6 million in February. Order

Technical Outlook—p. 91 Market Outlook—p. 135

backlogs are the highest since February, 1953, and new business brought in this year should exceed $1 billion. Shipments may reach about $900 million.

GM Hits Monopoly Charges

Look for a strong public relations and advertising campaign by General Motors Corp. challenging as "unwarranted" the conclusions of a Senate investigating committee headed by Sen. Joseph C. O'Mahoney (Dem., Wyo.). The group charges that GM's "extremely high profits" call for price cuts to consumers. It urges that GM be limited in expansion plans into other industries.

Machinery: Good Buy

The cost of machinery and equipment to American industry relative to the average cost of an hour's labor has been reduced since 1941 by almost one-third. Machinery & Allied Products Institute's analysis suggests that this has been an important stimulus to postwar capital equipment sales.

U.S. Steel in Quebec

U.S. Steel Corp. is looking over a large low-grade iron ore prospect in northeastern Quebec for possible development. A Canadian subsidiary, Cartier Mining Co. Ltd., has been investigating near the Labrador-Quebec border. Preliminary surveys indicates presence of ore running about 30-per-cent iron, which will require beneficiation.

Big Business in Containers

Watch for the container industry to continue its remarkable record of growth this year. In the last ten years, consumption of steel for cans has increased every year—from 2.8 million tons in 1946 to 4.5 million in 1955. Annual shipments of collapsible tubes have jumped from 5.1 million gross in 1949 to 7.3 million gross last year. Shipments of wirebound boxes and crates during 1955 exceeded the 1954 volume by 6.2 per cent. Metal cap deliveries rose 11.3 per cent from 1954 to 1955. Steel shipping barrel volume climbed from 31.6 million units in 1946 to 36.2 million in 1955. Steel shipping package sales hit 77.7 million units in 1955, compared with 55.6 million in 1946.

Straws in the Wind

To aid mobilization planners, the Business & Defense Services Administration will survey 550 makers of construction machinery about the amounts of steel, copper and aluminum they used last year . . . Sales are up an average 15 per cent over last year on aluminum building products, reports Nichols Wire & Aluminum Co. . . . Westinghouse Electric Corp. will build a multimillion-dollar plant to make switchgear distribution apparatus near Bloomington, Ind. . . . Information on several thousand American Telephone & Telegraph Co. and International Business Machine Corp. patents now available license-free to the public can be had at Small Business Administration field offices.

Transcontinental pipelines are among the many places where Cathodic Protection and Anaconda Type CP Cable are used to check corrosion.

Cable that helps make the pipeline a good neighbor

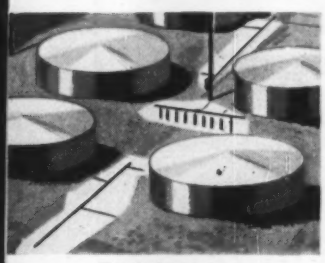
To make cathodic protection systems more economical and effective – to help pipeline and oil companies check costly corrosion, stop leaks, make pipelines good neighbors – Anaconda offers a special Type CP Cable that *lasts far longer* on the job than ordinary cable.

High-grade polyethylene insulation and tough Densheath* (PVC) jacket offer high resistance to electroendosmosis†, as well as high resistance to oil, moisture, and most acids, alkalies and chemicals found in corrosive areas. And rugged Densheath withstands toughest abrasion, moisture and weathering.

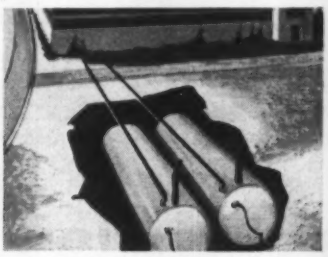
To order, or for more information—call the Man from Anaconda. Or write: Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.

†Cable failure on direct current in wet locations 56357
*Reg. U.S. Pat. Office

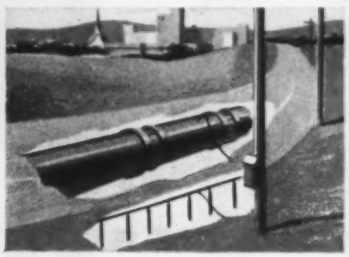
WHERE ANACONDA TYPE CP CABLE AND CATHODIC PROTECTION CUT CORROSION COSTS



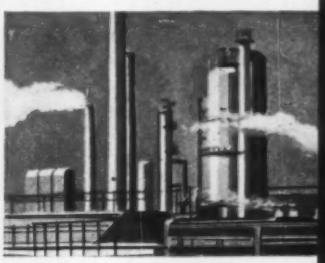
Tank farms



Underground storage tanks



Pipelines



Oil refineries

ASK THE MAN FROM ANACONDA®
FOR CATHODIC PROTECTION CABLE

Two Ways Armco ZINCGRIP Steel Tubing May Help You Cut Costs, Build Sales

Typical applications where ZINCGRIP Tubing helps build sales and cut costs.

Besides the cost-saving design possibilities offered by steel tubing, Armco ZINCGRIP Tubing can give your products a big plus value: **It is the protection of a special zinc coating.**

Long Product Life

The mill-applied, hot-dipped zinc coating, on inner and outer walls of the tubing, is assurance of extra durability for your products . . . more satisfied customers. And the smooth, attractive finish of ZINCGRIP Tubing can give your products another powerful selling point.

Economy in Fabrication

With ZINCGRIP Steel Tubing you can take full advantage of the weight reductions possible with rigid tubular construction. Easy-to-fabricate, lighter-weight products can save you money and help boost sales.

You can bend, join, flange, upset or bead Armco ZINCGRIP Tubing on standard equipment. The special zinc coating *stays on* . . . doesn't flake or peel in fabricating operations.

For Your Products?

Manufacturers of conveyor rolls, farm equipment, lawn mowers and sweepers, TV antennas and scores of other products are making profitable use of Armco ZINCGRIP Steel Tubing. Why not consider its advantages for the products *you* make or use?

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Holding Your Market?

If you're making a product accepted by a host of eager, blue-chip customers, the market for that product undoubtedly appears to have a brilliant future. But does it?

For the answer, let's take a basic material—bituminous coal—and some of the industries associated with it.

Three or four decades ago, coal was the basic source of energy for domestic and industrial use. The potbellied stove, steam locomotives, ships and industrial plants were gobbling up huge tonnages of coal.

Then coal lost a big chunk of its market to government-financed hydroelectric power, gas and oil. The potbellied stove gave way to the gas and oil-fired furnace; locomotives and ships switched to diesels; and industrial plants went to electric power. Coal became known as a dying industry.

The coal industry demonstrates that you can't be sure of the market for your products, no matter how basic the need.

Now the scene is changing. Coal is benefiting from the over-all increase in demand for energy and higher prices for competitive fuels. It also is fighting back to regain lost markets.

In the mines, the emphasis is on individual skill and mechanization. A miner now can produce 2240 tons of coal a year, compared with 884 tons in 1925. Labor savings of $1 a ton are reported on a product bringing $4.50. The goal is a fully automated, continuous mining machine with a sensing device to direct it up and down the seam along a predetermined path. The trolley or monorail conveyor will move the coal back in a continuous stream. A 108-mile coal pipeline to Cleveland will cut a $3.22 rail rate in half and could be the first link in a national network.

In probing for markets, Bituminous Coal Research Inc. is coming up with a new automatic furnace for residential use. It's dressed up in an attractive white enameled package and makes coal competitive with other fuels. A new automatic steam generator with capacities up 20,000 lb an hour will invade the industrial market.

A coal-fired, gas-turbine locomotive is likely to be on the rails next year. It will have a cruising range of 20 hours, using 13½-tons of fluidized coal pumped from tanks to the turbine. Operating costs will be slashed from 83 cents per million Btu for diesel fuel to 20 cents for coal.

Holding your market requires constant vigilance, a watchful eye on production methods, costs and products that have utility and appeal.

Irwin H. Such

EDITOR-IN-CHIEF

VALLEY MOULD AND IRON CORP.

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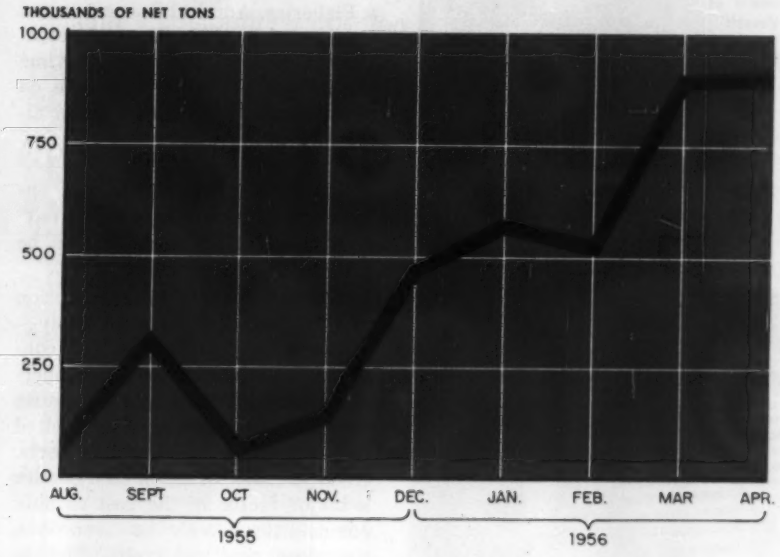
Steel Inventories Rise

(Tonnages added each month in finished products)



Automen Stock Up

An estimated 18 to 20 million tons are inventoried now, primarily in cold-rolled sheets and in the auto industry. Stockbuilding in April hits a peak

STEEL INVENTORIES are building up, but there's little likelihood of a general inventory reduction such as we had in 1953 and 1954.

Reason: Stocks are not being fattened up across the board. Inventory buying is concentrated principally in the automobile industry, and mainly in cold-rolled carbon sheets.

April High — Computations by STEEL show inventory accumulation has occurred each month beginning with last August and that the rate has accelerated this year. April was the high point in the nine-month period.

Some analysts believe there are 18 million to 20 million tons of steel in inventory, but they agree that most of it is in the automobile industry and that most of the stocks are cold-rolled sheets.

Impetus—There are three general incentives to pile up inventories: 1. Probable steel price increase at midyear. 2. Heavy consumption of most forms of steel. 3. Need for steel to carry over a possible strike of steelworkers.

The auto industry has another incentive to build inventories of cold-rolled carbon sheets. When it's producing at top speed, it and other consumers use them faster than they can be made. As long as there is any possibility of cold-rolled sheets being in short supply, the auto industry is inclined to put some into inventory.

Another Story—In some of the major forms of steel, consumers not only have been unable to build inventories, but they haven't been getting enough for current usage. Those forms include plates, standard structural shapes, wide flange beams, seamless mechanical tubing, line pipe, oil country tubular goods and small sizes of hot-rolled carbon bars.

These products are booked on firm orders for as far ahead as producers will accept them, and the outlook for demand continues strong. In March, the construction industry, which uses structurals and plates, received a record-breaking (for March) volume of contracts for future work. The railroad freight car industry had orders on Apr. 1 for 137,070 cars —enough to keep it busy the rest of the year. It takes plates to build freight cars. Some railroad car shops are threatened again with a suspension of operations because of the plate scarcity.

Selective—The auto industry is stocking only the forms of steel it thinks it might have difficulty getting. It's not trying to load up on alloy bars. There's plenty of capacity for alloy steel.

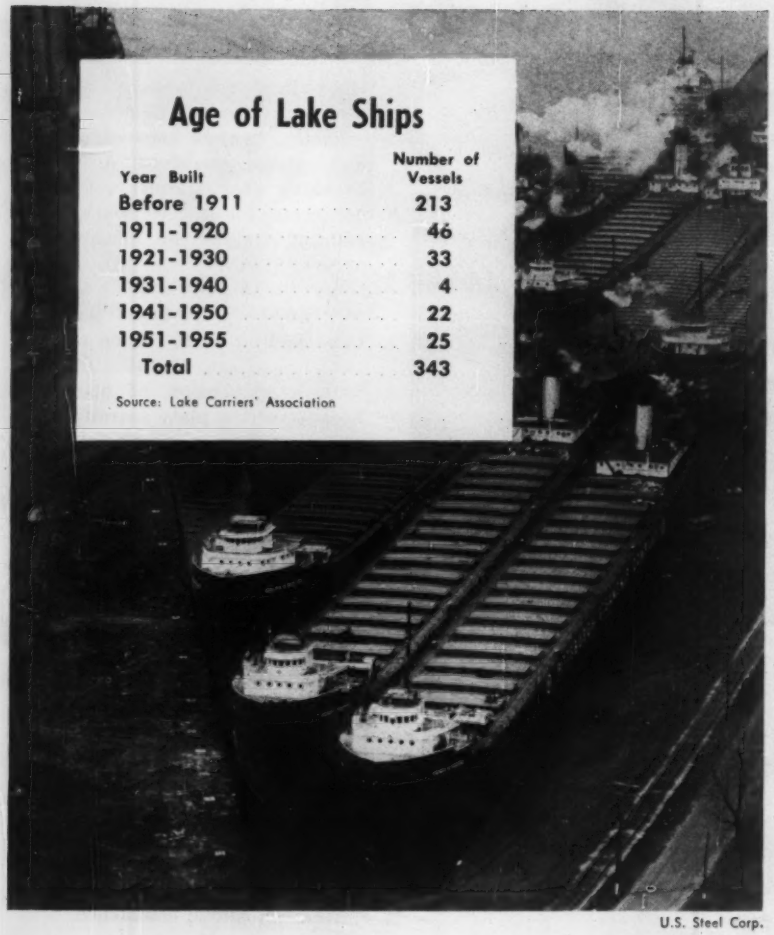
While the absence of across-the-board steel stockpiling precludes the probability of an inventory recession, the auto industry, steel's largest consumer, could retrench. It uses around 20 per cent of all the finished steel produced. Forty per cent of its take is in cold-rolled sheets. They come to about 20 per cent of all finished steel.

Confidence—The fortunes of the automobile have a substantial influence on public confidence.

Some people believe the auto industry is merely figuring in one of the rolling adjustments which have characterized our economy for the last several years. While it is catching its breath, other industries (such as construction) are booming. As long as these adjustments are staggered and temporary, business as a whole will be good.

Material Handling Bookings Up

The Material Handling Institute Inc. reports that January and February bookings are running above the record-setting monthly average of 1955. January registered 122.42, and February increased to 129.56 (1954 = 100). The institute says that more new pieces of equipment and developments will be announced by the industry this year than ever before. Indications are that bookings this year will exceed last year's by more than 10 per cent.



Age of Lake Ships

Year Built	Number of Vessels
Before 1911	213
1911-1920	46
1921-1930	33
1931-1940	4
1941-1950	22
1951-1955	25
Total	343

Source: Lake Carriers' Association

U.S. Steel Corp.

Lake Shipping Threatened

Foreign competition, high operating costs, ore imports and old ships hamstring efforts of U.S. fleet owners to keep pace with an expanding economy and defense needs

SHIPBUILDING on the Great Lakes is at a standstill. No new bulk cargo vessels are on order.

Adm. Lyndon Spencer, president of the Lake Carriers' Association, says vessel operators lack incentive to start new construction. Reasons: 1. Foreign ores are becoming more competitive in price with Lake Superior ores. 2. High construction and operating costs hamper U. S. ships in competition for the growing trade between Canada and the U. S.

Additional Problems—Once the St. Lawrence Seaway is completed in the spring of 1959, international commerce of bulk commodities between the U. S. and Canada will be thrown open to vessels of all nations.

Last year, U. S. bottoms carried less than 29 per cent of this commerce, a contrast with the more than 76 per cent they carried 30 years ago.

From the standpoint of shipping, Admiral Spencer is sure foreign operators will reap big benefits from the seaway, probably at the expense of Great Lakes operators.

The 343-vessel fleet is old (see table). Only 25 ships have been built since World War II.

Testimony—Before the Senate subcommittee on Merchant Marine & Fisheries, Admiral Spencer urged passage of S. 3108. It would establish a reserve fleet for wartime needs from old ships traded in on new vessels. It provides a credit allowance intended to allow the vessel operator to acquire the new vessel at a price which will enable him to meet competition. Foreign construction costs are to be used in determining the credit.

Admiral Spencer took exception to a Commerce department study—it found no justification for construction subsidies for ships operating between U. S. ports because foreign-built ships are prohibited from operating between U. S. ports. He says transportation charges are a major factor in the cost of bulk commodities, such as iron ore, limestone, coal and grain. The future of the Great Lakes shipments depends on keeping these commodities competitive with foreign shipments carried in vesels that cost about 60 per cent less than ours to build and over 45 per cent less to operate.

More on Joint Ore Project

Within the next week or so, contruction will get under way at the Hilton iron ore mines, about 90 miles north of Kingston on Lake Ontario. The Steel Co. of Canada, Ltd., Hamilton, owns 50 per cent of the project. Pickands Mather & Co., Cleveland, and Jones & Laughlin Steel Corp., Pittsburgh, have 25-per-cent shares.

It's estimated that development will cost some $16 million. Iron ore will have to be processed through more than 20 stages to produce an acceptable blast furnace or open-hearth feed, with almost 5 tons of material mined for each ton shipped.

Production is estimated at 600,000 tons a year. At this rate, the mine will be workable by open-pit methods for 15 years. At least half its production will be made into steel in Canada. Stelco's expansion plans call for a 25-per-cent boost in facilities by 1960.

Taconite to the Test

For the first time enough taconite pellets will be available for the "30-day trial." Estimates of possible results vary. Taconite's competitive position is assured

THE $64-MILLION question in the steel industry this year is: How will taconite affect blast furnace production? The quiz-masters include: U. S. Steel Corp., Bethlehem Steel Corp., Republic Steel Corp., Jones & Laughlin Steel Corp., Youngstown Sheet & Tube Co., Inland Steel Co., Armco Steel Corp., Wheeling Steel Corp., Steel Co. of Canada, Ford Motor Co. and International Harvester Co.

These steelmakers, through their interests in five major U. S. taconite and jasper projects (taconite is found in Minnesota; jasper is its Michigan cousin), can now obtain enough concentrated ore to make extended blast furnace tests possible. This month the first boatload of taconite from Reserve Mining Co.'s Silver Bay, Minn., operation came into Cleveland, destined for Republic's furnaces.

Isolation Booths—Since 1947, taconite has probably been charged into furnaces in amounts varying from 10 to 100 per cent of the burden, and for continuous operations running as long as ten days. But steel companies will not reveal their findings. Experts agree a valid test takes 30 days, which would allow enough time to average out fluctuations in furnace operation.

What characteristics of taconite will affect blast furnace practice the most? Probably these two: 1. Higher iron content, which will boost the yield of pig iron. 2. Uniform quality of the pellets, which may make furnace control much easier.

No Millenium—Some specialists first thought that taconite with 60-per-cent iron content should automatically yield 20-per-cent-more pig than open-pit ore with 50-per-cent iron content. But that logic isn't working out because 100-per-cent charges of taconite "have not produced results quite as expected," says one furnace engineer. A steel company consultant phrased it this way: "In South America, they tried high-iron-content Venezuelan ore and discovered they couldn't get the right slag volume. There may be distinct advantages in using less taconite, maybe as much as 60 per cent of the burden but probably between 30 and 40 per cent, to get the desired metallurgical reaction."

One steelmaker reportedly has been redesigning furnaces to take a full burden of taconite. Other producers seem to favor a mixture of taconite with other ore. They will redesign furnaces, too, although the extent has not been determined.

Production — Here is today's scoreboard on taconite production: Oliver Mining Division, U. S. Steel, still regards its project as experimental; it produced 600,000 tons last year. Reserve Mining Co. (jointly owned by Republic and Armco) turned out its 1-millionth ton this month; this year's production will be between 3 and 3.5 million tons. Output can be expanded to 10 million tons.

Erie Mining Co. (owned by Bethlehem, Youngstown, Steel Co. of Canada and Interlake Iron Corp. and operated by Pickands Mather & Co.) will go into production next year. Rated annual capacity is 7.5 million tons. Production could be boosted to 10.5 million.

Jasper: Ford and Cleveland-Cliffs Iron Co. have been concentrating the ore since 1951 at the pilot Humboldt Mining Co. The new Marquette Iron Mining Co. (owned by Cleveland-Cliffs, Inland, J&L, Wheeling and International Harvester) will have a 500,000-ton capacity agglomerating plant in production later this year. By 1964 capacity will be 3 million tons.

Competitive Ore—No taconite will be sold on the open market, say the mining companies.

Taconite's competitive position against such ores as those from Labrador and Venezuela seems assured. Steelmakers will be getting 20 per cent more from their transportation dollar because of the higher iron content, and the state of Minnesota seems determined to keep taxes on taconite low to make it competitive.

Conclusion—By 1957 we should know generally how taconite reacts in the blast furnace. There will still be three problems that each steel company will have to work out for itself: 1. The critical point of the charge (per cent of taconite). 2. The design of the furnace. 3. The personal equation of the furnace operator. He must develop techniques to handle taconite.

U. S. Taconite Production*

1955	2.0 million tons
1956	4.5 million tons
1957	10.0 million tons
1958	13.0 million tons
1970	33.5 million tons

*STEEL's estimate. Figures include production of Erie Mining Co., Reserve Mining Co., Oliver Iron Mining Division, U.S. Steel Corp., Marquette Iron Mining Co. and Humboldt Mining Co.

Metalworking's First Quarter Earnings: Good

Selected Manufacturers	1956	1955	Selected Manufacturers	1956	1955
Allis-Chalmers Mfg. Co.	$ 5,768,599	$ 5,920,165	IBM Corp.	15,323,060	11,401,947
Aluminum Co. of America	24,287,262	21,167,597	Intertype Corp.	349,448	238,109
Atlas Tack Corp.	46,098	9,046	Lamson & Sessions Co.	646,000	479,537
Bridgeport Brass Co.	1,651,345	1,275,765	Minneapolis-Honeywell Reg. Co.	4,536,064	3,728,240
Chance Vought Aircraft Co.	749,293	701,984	Monarch Machine Tool Co.	222,262	104,815
Diamond T Motor Car Co.	259,882	55,319*	Pittsburgh Screw & Bolt Corp.	530,804	153,661
Eaton Mfg. Co.	3,760,770	3,295,277	Reed Roller Bit Co.	529,000	251,370
Ford Motor Co.	73,700,000	102,500,000	Schick Inc.	424,830	154,567
Fram Corp.	1,362,091	929,569	Signode Steel Strapping Co.	1,013,924	774,848
General Electric Co.	54,962,000	52,516,000	Texas Instruments Inc.	540,000	391,000
General Motors Corp.	283,000,000	309,406,862	Union Carbide & Carbon Corp.	36,231,322	28,397,079
Hanson-Van Winkle-Munning Co.	141,687	6,566	Walworth Co.	1,139,226	466,337

* Net Loss

OPTIMISM is the theme of metalworking's first quarter report. In the few instances of earnings lower than those in 1955's first quarter (see table), company spokesmen offered logical reasons, and predicted better results for the rest of the year.

Auto makers are the best case in point. "Dealers are in a good position," said L. L. Colbert, president, Chrysler Corp. "Earnings will be lower because of the cut in output and greater selling costs, but retail sales were substantially ahead of factory shipments."

Higher Costs — Henry Ford II echoed Mr. Colbert: "Higher costs associated with the Ford Motor Co.'s new facilities and product program this year" contributed to a decline in earnings. Ford's sales dropped from $1.4 billion in last year's first quarter to $1.2 billion this year.

General Motors Corp.'s unit sales were less than 0.5 per cent below those of 1955's record first quarter, while earnings were down about 8 per cent.

Less defense business also had its effect on the earnings of some firms. Underwood Corp. experienced an "unexpected" drop in defense orders and reported earnings of $146,000, compared with $434,000 for 1955's first quarter. A "leveling off" of defense business for General Electric Co. didn't help that firm's earnings; 20 per cent of its sales are now defense items.

Higher Prices—"Increased prices helped sales to increase," Reed Roller Bit Co. reported. Its sales were up 40 per cent to $7.9 million. Second quarter earnings for some metal users may be supported by further price hikes to consumers.

The steel shortage held down Alco Products Inc.'s earnings, said Perry T. Egbert, president. March shipments were on schedule, but January and February shipments were down 27 and 15 per cent from last year's.

Best Backlogs—Standard Railway Equipment Mfg. Co. had a record backlog of business (except for 1950's order pileup). Because of car building activity, Pittsburgh Screw & Bolt Corp. showed sales of $10.4 million, compared with $7.7 for the first quarter of 1955. Orders now in process for Glenn L. Martin Co. will mean higher earnings for the rest of the year; earnings in the first quarter were $1.6 million, compared with $2.1 million in the same period last year.

Mack Trucks Inc. reported backlogs of civilian business at $67 million on Mar. 31, compared with $21 million a year ago, and $45 million at the end of 1955.

All-Time High — Earnings of $11.6 million were a record high for Reynolds Metals Co. and a 58-per-cent increase over the first quarter of last year. Net sales were a new record of $106 million, up 21 per cent.

Diversification continued to pay off for American Machine & Foundry Co.: Morehead Patterson, chairman, predicted first quarter earnings would be up 125 per cent from 1955's. John I. Snyder Jr., chairman, U. S. Industries Inc. (another firm that's diversifying), stated his earlier forecast of around $125 million in sales this year "will be reached and probably exceeded."

Mesta Gets U.S. Foundry

It looks as though Mesta Machine Co., Pittsburgh, will be the new owner of the government foundry at New Castle, Pa. It submitted a bid of $8 million for the plant, which was auctioned on Apr. 20. Built in 1942 to produce heavy steel castings, its cost was some $23 million.

The only other bid came from United Engineering & Foundry Co., also of Pittsburgh. United has been operating the foundry for the government, and put in a bid of

some $7.5 million. Sale of the plant to Mesta is subject to approval by General Services Administration and the Defense and Justice departments.

The sale may be headed for a legal wrangle. Labor representatives protested the auction on the ground that hundreds of skilled workers in New Castle had acquired seniority, pension and other rights with United which would be lost if Mesta takes ownership.

Military Metals Take Slides

Third-quarter allotments of steel, copper and aluminum for "A" products for defense and atomic energy needs have been announced by Office of Defense Mobilization. They're all lower than allotments for the second quarter.

"A" product allotments represent purchase authority to prime contractors and producers of military equipment for the three metals at mill level. Steel allotments are 2.5 per cent lower than for the second quarter (592,169 net tons, compared with 607,333 net tons). Allotments of both aluminum and copper are down 5 per cent, to 125 million and 52 million lb, respectively.

Acme Steel To Integrate?

Acme Steel Co., Chicago, is weighing the merits of moving toward a more integrated operation. At the annual shareholders' meeting, President Frederick M. Gillies said that to increase its efficiency any more, Acme must find a way to get its basic raw materials at lower cost. Result: "A move in the direction of producing part of our steel requirements may become a reality before the end of the year."

Acme now buys semifinished steel from the integrated producers for conversion into finished products like auto frames, heating equipment and hardware. Mr. Gillies says that particular attention is being given to the oxygen converter method of steelmaking. He estimates that facilities would cost between $65 million and $100 million.

Steel's First Quarter: Record

Selected Steelmakers	1956	1955
U. S. Steel Corp.	$104,160,945	$72,652,402
Republic Steel Corp.	25,041,392	18,192,265
Jones & Laughlin Steel Corp.	13,559,000	9,642,000
National Steel Corp.	14,102,586	11,203,461
Youngstown Sheet & Tube Co.	10,193,856	7,975,488
Inland Steel Co.	14,015,549	10,432,755
McLouth Steel Corp.	2,439,077	893,255
Crucible Steel Co. of America	3,680,966	2,248,896
Pittsburgh Steel Co.	2,469,624	909,741
Detroit Steel Corp.	2,178,832	1,015,035
Granite City Steel Co.	3,779,801	2,261,104
Allegheny Ludlum Steel Corp.	4,572,608	2,410,906
Lukens Steel Co.	1,361,641	292,384
Alan Wood Steel Co.	689,172	269,397
Lone Star Steel Co.	2,243,866	809,405
Continental Steel Corp.	728,643	699,805
Rotary Electric Steel Co.	613,220	825,459

WITH STEEL order books filled for the second quarter, you can expect earnings to match or better those of the first quarter (see table).

Avery C. Adams, president, Pittsburgh Steel Co., keynoted the industry's outlook: "I am hopeful we will report larger earnings in the last half of the year than we expect to report in the first half." Pittsburgh's first quarter sales were up 34 per cent from those of the first quarter of 1955.

To Keep Pace—Some steelmakers are concerned about the failure of earnings to rise in proportion to increased sales. Crucible Steel Co. of America reported sales of $69.3 million for the first quarter, compared with $50.9 million in 1955's first quarter. Rising costs, particularly of scrap, said William P. Snyder Jr., chairman, are slowing the pace of earnings.

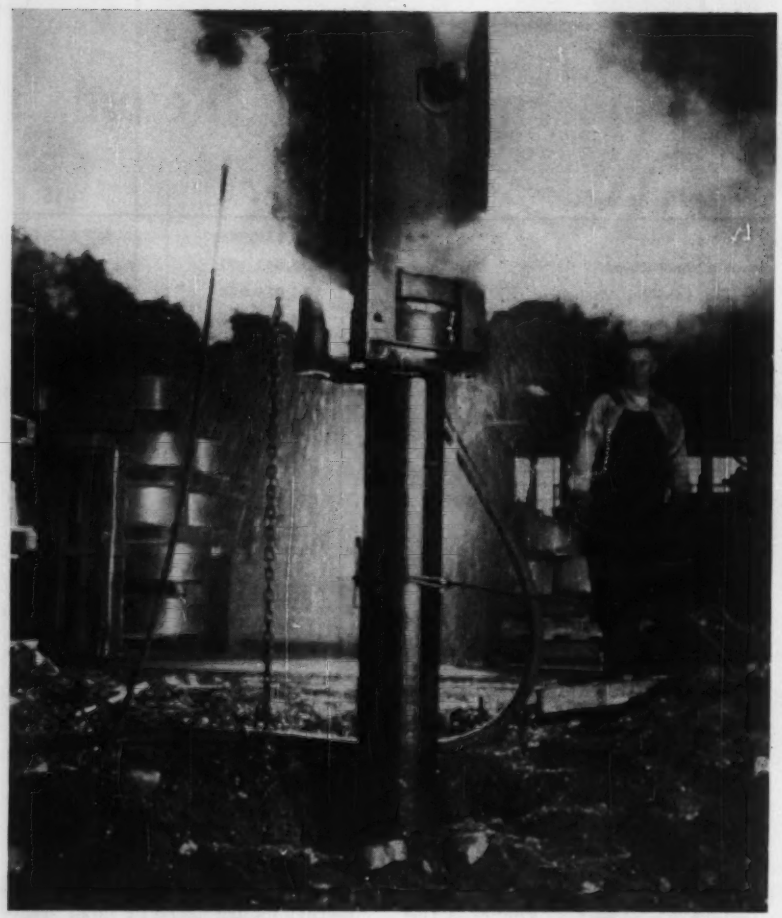
Sales of Allegheny Ludlum Steel Corp. were up 39 per cent from last year's first quarter. Detroit Steel Corp.'s earnings were 100 per cent better, with sales up about one-third. McLouth Steel Corp. reported sales of $40.6 million, a $12-million increase from the first quarter of 1955.

Work Stoppage—The only steel producer to comment on a slowdown in production was Rotary Electric Steel Co. A 12-day work stoppage and increased raw material costs contributed to the drop in first quarter earnings.

Close to capacity (or better) operations are noted by most steelmakers. Production at 110 per cent of capacity gave Jones & Laughlin Steel Corp. record earnings, shipments and sales during the first quarter. Sales were $195 million, compared with $152 million in 1955's first quarter. Republic Steel Corp. also reported record sales and earnings. Total production, said C. M. White, president, should better last year's.

Big Steel — Roger M. Blough, chairman, U. S. Steel Corp., provided the outlook statement for the industry, based on first quarter results: "Close to capacity operations in the second quarter, around 98 to 100 per cent. Third quarter should be somewhat lower, but not seriously down. The fourth quarter should be up."

U. S. Steel had an order backlog of 7,449,000 tons on Mar. 31, compared to 6.7 million tons three months previously, and 6.3 million tons a year ago. First quarter earnings were the best for any first quarter in the company's history.



Workers keep production rolling near pile drivers as . . .

Strip Mill Modernizes

HOW DO YOU expand and modernize a specialty strip mill while continuing production at peak levels? Riverside Metal Division, H. K. Porter Company Inc., is meeting the challenge because it planned its strategy for a year before work began in November, 1955.

Riverside's objectives: 1. Bring straight-line material flow to the plant by relocating equipment. 2. Increase capacity. 3. Expand sales horizons by making a wider range of products. The program called for the installation of new tolerance devices, the revamping of mill machinery and the introduction of extensive material handling equipment.

"But even after a year of planning we ran into problems we had never dreamed of," says W. Harvey Thompson, general manager.

Action—A 2-high rolling mill was sold to provide floor space to relocate the finishing room. The concrete pits for the pickling line were built and the equipment (including a blower unit) was moved on a week end. One end of the building was torn down so that the walls could be extended to provide space for a boxing and shipping area. Meanwhile, a large roller-hearth furnace was being installed in an aisle which had been the main transportation artery.

Headaches—Personnel problems mounted. Temporary partitions blew down. Workers began to grumble about the cold. Space heaters, hurriedly brought in, helped solve the first crisis. A mill operator had a wooden covering built over and around him so that a shovel could lift dirt over his head while it dug out a pit for two new bell-type furnaces. Seven slitting machines were moved one at a time, on week ends.

Old Problems—"While we could cast long and wide bars (phosphor bronze, nickel silver, beryllium copper, etc.), we would have to cut them into short lengths so that our manual crews could handle them," explains Roland Wilson, assistant to the general superintendent. Bars could not weigh more than 200 lb. Extensive welding was needed when the bars were converted to long lengths of sheet.

It is estimated that the new material handling system will allow the use of 800-lb castings (and, ultimately, larger ones). When all changes are completed, castings will be turned into sheet and be on the shipping dock with handling distances reduced by as much as 70 per cent.

Revamp—As bars go through, old furnaces are being equipped with preheaters to help boost heating capacity 25 per cent. A water recirculating system is now connected to three furnaces to help conserve tightening water supplies.

Material handling equipment for the mills will soon be under construction. When it is all in place, they will work up an estimated two-week backlog and then be moved into the new material handling "harness."

Jobs—The introduction of increased mechanization should have little effect on personnel. Reason: "Our volume should double. This means that the same number of men will be able to turn out twice as much," says Mr. Thompson. Target completion date for the project: December, 1956.

Blower Sales Boom

Manufacturers have almost doubled their business since 1950. With demand from steel and other industries still stepping up, more gains are certain

"SALES are much better than the good 1955 volume," says E. R. Anderson, sales manager, Chicago Blower Co., Franklin Park, Ill. Department of Commerce statistics show that blower sales have nearly doubled since 1950. Last year they hit the $97.6-million mark. With demand for centrifugal and axial flow blowers at gale proportions, the industry is setting its sights on $110 million in sales this year.

All Are Buying—A STEEL survey shows that almost all customers of the blower industry will raise their requirements in 1956 (about 115 firms make blowers). Heavy steel demand, growth of air conditioning and expansion of refractory and cement mills spark the sales picture. Robert O'Rourke, assistant secretary, National Association of Fan Manufacturers, Detroit, comments: "The steady increase in shipments during recent years should continue in 1956, as steelmakers and other leading customers enjoy a good year."

Healthy Gain—Blower producers expect a 10-per-cent gain in sales to steelmakers this year. Demand is rising for high-pressure blowers used in furnaces, finishing mills, coke ovens and forging shops. "To raise production using present facilities, many mills are modernizing by pushing more air through existing ductwork," adds a sales official of American Air Filter Co. Inc., Louisville. Blower manufacturers are beefing up this equipment.

For the past year, mills have strained for maximum pig iron output. Because of the high cost of building new capacity, many mills install sintering facilities which demand heavy blowers. For every ton of pig iron produced in blast furnaces, at least 3 tons of air goes through the furnace. Blowers must operate efficiently 24 hours a day to keep the big stacks in operation. Automatic scarfing, another growing trend in the steel industry, requires blowers to remove fumes.

Tough Service—Blowers are operating under higher temperatures and more corrosive conditions in sintering plant and galvanizing mill applications. The design trend is to use more high alloy steel for better protection.

Closely connected with metal production is the problem of smoke control, which is receiving increasing attention each year. Control of particle emission requires blowers for air movement.

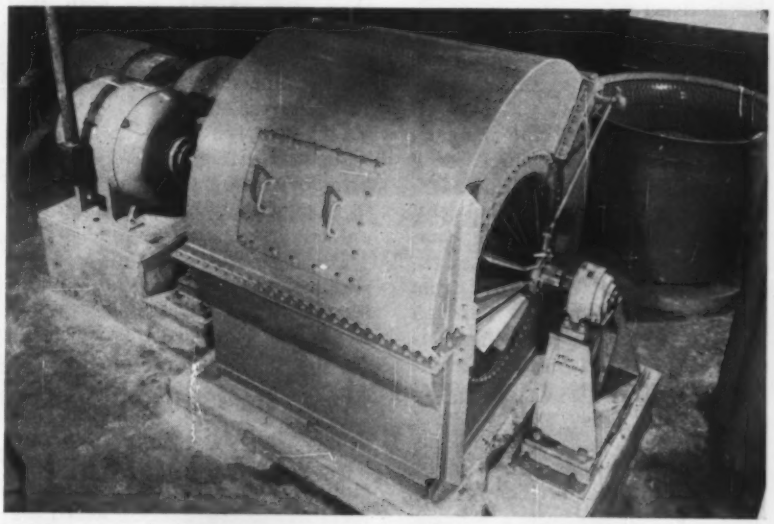
Three Leaders—Blower manufacturers ride a triple boom in sales to air conditioning, ceramic and cement industries. Air conditioning equipment in new office buildings, schools and homes requires high-precision blowers.

"The ceramic industry is one of the leading users of fans and blowers," report officials of Westinghouse Electric Corp.'s Sturtevant Division, Boston. The rapidly expanding cement industry needs modern blowers for its new plants.

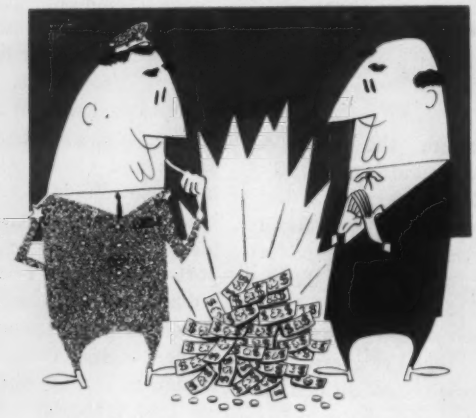
Many Users—"It would be difficult to find a limit to use of air-moving equipment in industrial plants and elsewhere," say Westinghouse officials. "Blowers exhaust fumes in chemical and food plants and foundries. They transport materials in textile and wood industries. An absolute necessity in power plants (for forced and induced drafts on combustion chambers), they also bring fresh air into vehicular tunnels."

Design improvements mentioned by many manufacturers include greater blowing efficiency of blades and quieter operation. These improvements contribute to the broader acceptance of blowers.

New Records Ahead — "With principal customers expanding and new users appearing regularly, the only bar to increases in sales is the shortage of plate to make the equipment," says a large eastern producer. "Show us where to get plate and we'll give you a record-smashing year."



Tidy blower installation by Westinghouse Electric Corp., Pittsburgh



Congressional predictions of $2-billion surplus stir . . .

New Hope for Tax Cuts

TALK OF TAX CUTS is still close to the hearts of politicians in this election year.

Sparking the latest go-round is a statement by the Joint Committee on the Economic Report that the federal budget will show a $2-billion surplus for the fiscal year ending June 30, an even bigger one for fiscal 1957. In his budget message last January, the President predicted only a $230-million surplus in fiscal 1956, a $435-million surplus in fiscal '57.

Last week, President Eisenhower tried to squelch new talk about tax cuts. After a White House meeting, Treasury Secretary George M. Humphrey stood by the January estimate. If there is more money available, administration leaders want it applied to the national debt.

Rolling In — Behind the committee forecast are bigger than expected receipts, especially from corporate income taxes. Through Mar. 31, corporate tax collections were up almost $2 billion over the same period of fiscal 1955. Personal income taxes were up more than $2 billion, excises $800 million.

Even though higher spending will eat away some of those jumps, some congressmen see a surplus as high as $4 billion. Treasury officials are mum on any upward revision of their own estimates. Their position is still that any talk of tax reduction will have to wait until new revenue figures are available May 20.

Cons—But surplus or no, many observers discount tax reductions this year. Inflationary pressures are too strong, they say. Pointing to recent credit tightenings, the comment is: "It makes no sense to put the brakes on with one foot, then step on the gas with the other."

The joint committee report itself recommends against cuts now. Top congressional tax writers with a few exceptions also are against reductions. It will take a major turn for the worse in the economy to change their minds—and that's unlikely at present.

Consensus: Tax cuts are not impossible, but are improbable. At least a modest payment on the national debt is needed this year.

Action on Lead and Zinc

What happens in the lead and zinc industries when stockpiling stops? Felix Wormser, assistant secretary of the interior, asked the question, but didn't answer it specifically, at a joint session of the Lead Industries Association and the American Zinc Institute.

But rather easily inferred from his comments is the fact that lead and zinc people can count on some kind of continued government action in their behalf.

It boils down to this: Stockpile requirements as set up anticipate that a healthy domestic industry will continue to produce lead and zinc during a conflict. So on the basis of national security, the government must see that the vital industry stays in condition to be able to produce.

Scarcities Bring Complaints

Recommendations by the attorney general that the Small Business Administration check up on the distribution situation in short supply materials (such as aluminum, copper and nickel) aren't likely to be carried out this year.

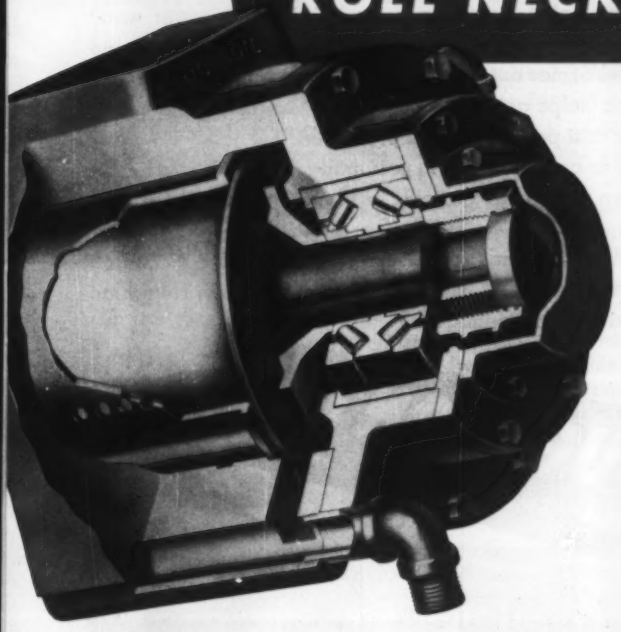
For one thing, SBA wants legislative sanction before embarking on such an endeavor—and there's little chance of congress finding time for such action.

If small business complaints about scarcities would show a marked increase, though, an attempt may be made to work out some sort of voluntary reapportionment of materials by suppliers —with an eye to aiding new or expanding companies that don't fare too well under historical use allotments. The big problem, admittedly, is that to ship more to firm A, you have to cut back firm B—and who is to decide which of the two to choose?

More on Mergers

A House - passed bill requiring merger - bound corporations with combined assets of more than $10 million to give 90-day notice to government agencies is in the Senate. Included in the bill is a provision to give the Federal Trade Commission the same power that the Justice department now has to restrain a merger pending judgment of its legality.

MORGOIL
ROLL NECK BEARINGS



These 26"-90 MORGOIL Bearings are operating in a 10½" & 30" x 30" single stand four high reversing cold mill at Lombarde Falck in Milan, Italy. Hot mills or cold mills, ferrous or nonferrous, at home or abroad, MORGOILS give the best roll neck bearing performance at the lowest cost.

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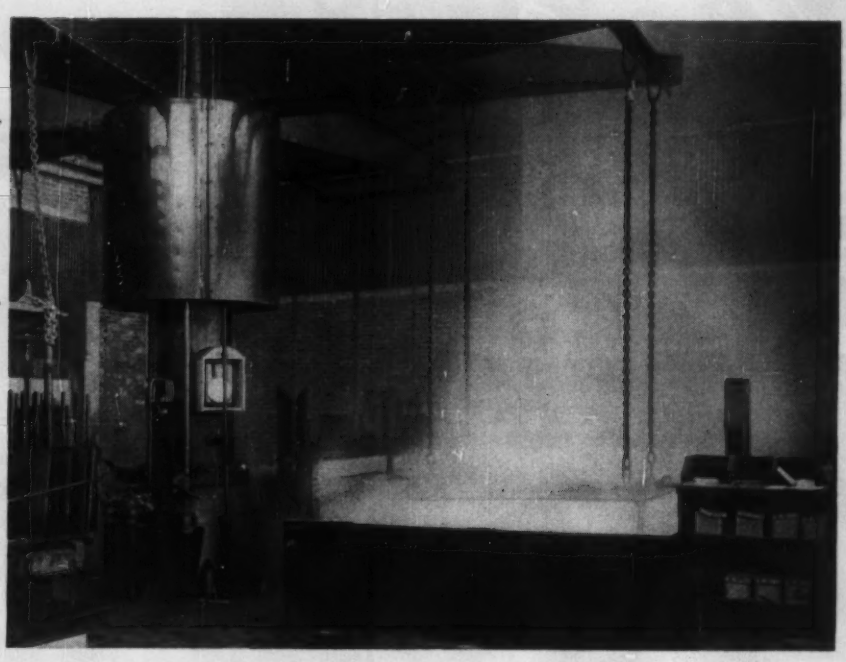
SPEEDS SCALE REMOVAL

SAVES STEEL AND ACID

WON'T BREAK DOWN



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Management at Work

Clark's Schirmer Aims at Export Sales

"FOREIGN MARKETS offer many heavy capital goods producers tremendous sales opportunities," says Walter E. Schirmer, vice president of Clark Equipment Co. "But you have to work at it to develop that potential."

Clark Equipment is one firm that's working at it. Its exports have increased tenfold since 1946, and in January a new subsidiary, Clark Equipment International, C.A., was formed to step up this growth. Mr. Schirmer was named general manager of the new international operation.

Dual Attack—There are two basic approaches to foreign markets, Mr. Schirmer points out. One is through exports; the other is through licensing foreign plants to make your products. Clark Equipment employs both.

"The currency situation and industrial progress of the country involved often dictate which will be to your advantage," he explains. "France, for example, has a relatively poor dollar exchange, so a licensee arrangement is best for us there. Egypt and South Africa are better export nations because their economy is tied more closely to ours, and they have more dollars to spend for our products.

"One advantage in having licensees is that most of them are not equipped to manufacture all the equipment we make. But their sales stimulate interest in our complete product line and thus serve to increase exports for our domestic plants."

Competition—The toughest problem in foreign marketing today is competition from foreign manufacturers in price and credit terms. "We're generally higher priced because of labor costs," he says, "but we were fortunate that the war left much of our equipment overseas, and we've gained a reputation for higher quality.

"Credit competition is more difficult to combat, however. Some countries, for example, are offering up to three years of credit. We have to work through government financial channels and a bid can be lost in the time it takes to negotiate competitive credit terms."

Background—A graduate of Illinois Institute of Technology and John Marshall Law School, Mr. Schirmer began his career with Clark Equipment as a patent attorney in 1937. During World War II, he served as assistant to the president, handling the firm's government procurement business; in 1947 he became vice president in charge of industrial truck sales. Before his present assignment he was head of market research and exports.

"I've just two hobbies," he explains, "pipe smoking and getting out-of-doors. I and three others have purchased 1600 acres in Michigan. It has three lakes on it, and our dream is to develop it into a hunting and fishing paradise."

Porcelain Enamel Volume

(in millions)

	1956 Forecast	1955	1954	1953
Household Appliances (Ranges, Refrigerators, Washers, Dryers, etc.)	$218	$210	$182	$191
Building Products (Plumbing Fixtures, Hot Water Tanks, Architectural, Signs, etc.)	150	136	110	104
Industrial Equipment	36	32	29	32
Cooking Utensils and Hospitalware	30	29	28	28
Jobbing and Miscellaneous	34	33	27	29
Total	$468	$440	$376	$384

Source: Porcelain Enamel Institute

Enameling Sales Climb

PORCELAIN ENAMELERS are expecting a banner year (see table). Behind the predicted 6.5-percent, industry-wide increase are: A healthy outlook for appliances, which account for about half of porcelain enamel sales, and a continuing construction boom, says the Porcelain Enamel Institute's Commerical Research Committee.

Companies are more optimistic, with executives looking for increases of 10 to 15 per cent. First-quarter business, at least, supports them.

Growth—"We believe 1956 will continue to reflect increased sales and net income over last year," notes R. A. Weaver, chairman, Ferro Corp., Cleveland, after reporting a first-quarter sales increase of 15 per cent.

New developments within the industry also point to continued growth. One is an active seeking of new markets: "We're not going to put porcelain enamel on everything—but we're going to try," comments John C. Oliver, managing director, Porcelain Enamel Institute.

Targets—1. Expanded use in the appliance field (some manufacturers use a baked enamel paint instead of porcelain enamel). The home laundry industry, room air conditioners and smaller appliances have big potential.

2. Greater architectural use. This is still a growing field. "The architect is much more interested in new uses for porcelainized materials," comments Emmet Dwyer, president, Wolverine Porcelain Enameling Co., Detroit.

"The best markets," says Blair Hellebush, sales manager, Kawneer Co., Detroit, "are institutional and commercial buildings. The trend is just beginning to develop for use in interior partitions. Making new industrial plants, especially the smaller, suburban plants, attractive to the eye will also be a factor."

3. Industrial uses, where corrosion or chemical attack is a problem. Food processing, oil refineries and chemical plants are big customers in this field.

Coming Up—Technical achievements are arriving fast. In or just out of development are: 1. Lower temperature frits. Nonpremium steels can be used without danger of warping caused by high temperature firing necessary with conventional enamels. Enameling of aluminum will be easier also.

2. One-coat application. Lower costs are the attraction. Some premium-priced steels specially developed for the purpose can be covered with one coat. New approaches to this problem have promise.

3. Automation. States A. S. Ault, sales manager, Chicago Vitreous Corp.: "Automation will be a key word in the next ten years in an industry that has been rather slow to mechanize. Automatic pickling has made great strides in the last few years; it will be improved and more generally used. The application picture is changing rapidly. A part was either hand dipped and drained or hand sprayed. We will see more parts flow-coated, automatically sprayed or dipped."

4. Color. Enamelers say that is one big advantage they have over other types of metal building walls. In the appliance field, the impact is questioned. Some view it as more of a sales gimmick—and admittedly a good one—to get the housewife into the store (where she buys the conventional white).

Matching—To meet competition from stainless steel and copper in kitchen goods, the enameling industry has developed finishes that look like gleaming metal but retain the durability and no-stain features of porcelain enamel. Along that line, O. Hommel Co., Pittsburgh, has applied for patents on "Chrome-tone," which has a ripple pattern in gun metal finishes.

As the industry points out: Porcelain enamel's role has been that of protector; now it's coming into its own as a decorative influence.

Phosphorus Capacity Doubles

Annual capacity for the production of elemental phosphorus will hit 383,000 net tons by July 1, 1957, indicates a survey by the Commerce department.

As of Jan. 1, 1955, annual capacity was 320,000 net tons, nearly twice what it was on Jan. 1, 1951, and 45,000 tons more than the expansion goal set for completion in 1955 by the Office of Defense Mobilization.

Phosphorus production has increased steadily since 1951. The most rapid growth of capacity was between 1952 and 1954.

During the last quarter of 1955, output was at an annual rate of 306,000 tons.

Anaconda Co.

With almost all customers working at capacity . . .

Metal Reel Sales Gain

METAL REEL and spool sales are winding toward a new record this year. Volume is forecast at $25 million, some 10 per cent above 1955's.

About 30 manufacturers do most of the business. About 15 of these are heaviest in industrial applications. The industry will use 150,000 tons of steel, mostly heavy plate, light sheet and structurals. Products range from typewriter ribbon spools to shipping reels 14 ft in diameter.

Center—Attleboro, Mass., is a leading center for manufacturers of processing reels and spools.

Robert V. Olson, president, Mossberg Pressed Steel Corp., says that demand is strong from all established customers, and that many new fields show good potential. Agrees C. D. J. Smith, treasurer, Apco Mossberg Co., also of Attleboro: "Metal reels and spools are replacing wood in many textile operations."

Detail — This year, processing reel and spool makers expect to do a $5-million business. Wire and wire fabricating industries account for over 90 per cent of the demand. Reason: The processing of almost every finished steel wire product (output is 5.5 million tons annually) requires one or more reels.

Trends: Stranding, rope wire laying, annealing, cabling, braiding, drawing, wire vulcanizing and annealing are among operations using more reels. There's also a move away from coiling wire in both the steel and nonferrous industries. Wire is being drawn at higher speeds and to finer gages. Sizes once handled on 200-lb reels are often drawn on 1000-lb equipment.

Shipping—Heavy shipping reels are another big dollar earner. The year's business should add up more than 10 per cent better than the 1955 peak of $3.5 million. "Specialty volume is active," notes L. B. Bozeman of New York Engineering Co. Most cable reels are built in the 2-to-6-ton-capacity range. A record was set by a 100-ton reel built to handle the Seattle-Alaska submarine telephone cable.

Others—Hose reel makers anticipate good gains. Sales last year were $4 million; this year they will be $5 million. Leading customers are petroleum, water and air hose makers and users. Clifford B. Hannay & Son Inc., Westerlo, N. Y., estimates that 50 per cent of hose reels are motor driven and that about 20 per cent of total output is used in industrial plants.

Philadelphia Valve Co., Philadelphia, another producer, notes increasing customer pressure for ball-bearing reels. Says John H. Johnson, reel division: "There is more demand for accessories like level winders and automatic stops. More interest in aluminum (for weight saving) is coming up."

Electric cable reels make up the last major sector of the reel and spool industry. Again, orders are up some 10 per cent from 1955's. Says C. S. Stryker, president, Gleason Reel Corp., Milwaukee: "If you include scrap yards, probably 90 per cent of electric cable reels go to industrial plants. Gantry crane electromagnets are one common use, and many other reels go into different types of material handling equipment."

ONE OF A SERIES . . .

What makes a cylindrical roller bearing good?

WELL-MADE, VERSATILE OUTER RACES

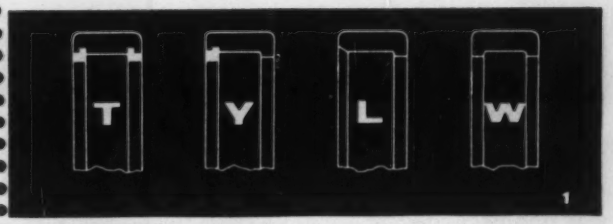
Outer races are vital parts of all roller bearings, except where housings can provide hardened and ground operating surfaces. In housings of aluminum, cast iron or un-heat-treated steel, outer races assure a dependable roller pathway.

While the outer race is not normally the critical member of the bearing, it can still suffer fatigue failure, like all objects subjected to stress repetitions. Therefore HYATT outer races are manufactured with the same scrupulous care that we apply to inner races and all other components of HYATT Bearings. We supply a wide variety of outer races, which makes HYATTS versatile enough to fit practically any design requirements. Some of these application and operating advantages are briefly covered at the right.

You'll find more details in HYATT General Catalog No. 150, or your nearby HYATT Sales Engineer will gladly help you choose the type best suited to your needs. Remember, HYATT is America's *first* and *foremost* maker of roller bearings. Hyatt Bearings Division of General Motors, Harrison, New Jersey.

GM GENERAL MOTORS

HYATT ROLLER BEARINGS

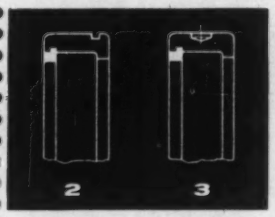


1. OUTER RACE TYPES

HYATT Hy-Load outer races are available in a variety of standard configurations (Figure 1). W, L and Y races have solid flanges, which sustain light or intermittent thrust loads. T and Y races with internal snap rings have equal radial load-carrying capacity but are not recommended for applications under continuous thrust. T, Y, L and W races may all be mounted using roller ends against the solid shoulder or internal snap ring for purposes of locating the outer race axially.

2. CIRCUMFERENTIAL LOCATION

An ample choice of outer race locating methods may be used with HYATT Hy-Loads. Circumferential location is often by a press fit. (Generally the rotating race should be applied with a press fit and the stationary race with a push fit.) When a push fit is used, axial clamping against the race ends provides satisfactory circumferential location. Positive circumferential location is provided by an outer race dowel.



3. AXIAL LOCATION

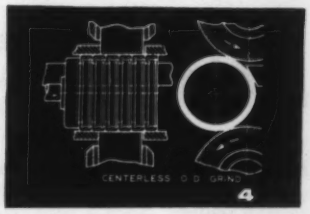
Axial location of an outer race is usually by pressing or pushing the race to a housing shoulder. The race may be prevented from "walking out" of the housing bore by the flange or snap ring operating against the roller ends. Axial clamping against a housing shoulder or snap ring provides positive axial location. However, if a shoulder is not available in the housing, an auxiliary holding device such as an external snap ring or an outer race dowel is needed. HYATT Hy-Load Bearings can be supplied to original equipment builders with outer races having a snap ring groove (Figure 2) or a blind dowel hole (Figure 3), at moderate increase in cost.

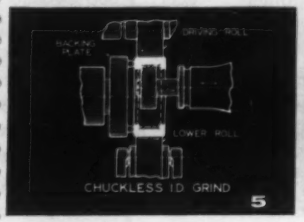
4. OPERATIONAL REQUIREMENTS

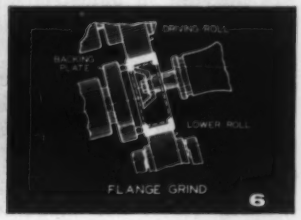
Quality controls are rigidly applied to all HYATT outer races to maintain: a. Minimum wall variation; b. minimum runout of race ends to bore; c. minimum runout of race flange inner faces to bore; d. minimum pathway and outer diameter taper; e. minimum outer diameter tolerance.

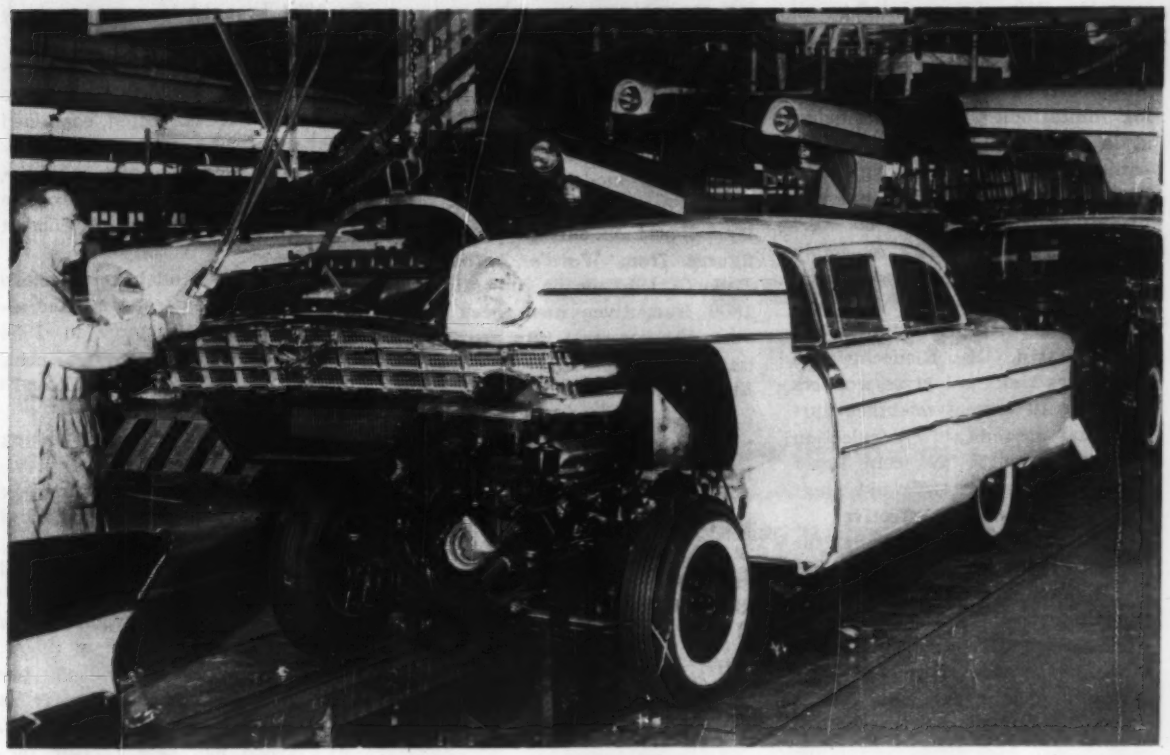
5. MANUFACTURING PROCEDURES

After careful primary machining and heat treating, ends are faced off square and parallel by a double end grind. This provides a reference surface from which all runouts and squareness can be gaged. Outer race diameters are generated by the centerless grinding method to provide an O.D. with as little out-of-round as practical. The through-feed method is a valuable economy (Figure 4). Next, the pathway (or race I.D.) is ground centerless, generating a cylinder concentric with the O.D. cylinder, by driving the race on the O.D. and positioning the grinding wheel relative to the drive roll (Figure 5). Finally, flanges are ground using the race ends as a reference. The result is a race of as nearly perfect geometry as is practical (Figure 6). Critical final inspection completes the procedures.









With this new model, Packard asks . . .

Can Executive Plug Gap?

INTRODUCTION of the Packard Executive at a time when the company is facing a financial crisis has raised some eyebrows.

Pessimists say the car is a last ditch stand for a company which wants to go down with all flags flying. Optimists hail it as the opening gun in a long haul back to firm financial footing.

Regardless of the corporation's health, it is evident that the Executive will fill a gap in its model line. It's also true that the car never could have been produced were it not for some solid manufacturing and merchandising concepts.

Merchandising — The Executive is aimed at the price bracket where 46 per cent of all upper-bracket cars are sold. Its dealer list price of $3460 puts it in competition with Buick's Roadmaster and Chrysler's Windsor.

Standardization is the key to producing the Executive at this price. Items such as power brakes and steering, automatic transmission, radio and heater are standard features. Customers have a choice of colors and body styles (four-door sedan and hardtop). Tinted windshields, electric door locks, nonslip differential and power seats and windows are the only optional features.

Manufacturing — Robert Rienecke, manager of Packard-Clipper's manufacturing and planning section, points out: "Production of the Executive wouldn't have been possible if it were not for the flexible manufacturing operations of our Conners avenue (Detroit) plant."

This plant was set up in the fall of 1954 when Packard closed its Grand boulevard (Detroit) assembly line where it had made cars for almost 50 years. The Conners plant originally was laid out for Packards and Clippers, but engineers made allowances for the possible addition of another line.

Mr. Rienecke cites four factors that contribute to the plant's flexibility: Integration of styling, design and manufacturing groups; improved assembly line procedures; limited stock storage; and quality control.

Marriage—"It has only been in the last few years that automobile companies have realized that a marriage of stylists, designers

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and manufacturing people can result in lower production costs," says Mr. Rienecke, explaining:

"By getting together early in the game, we find we can relate automobile designs to manufacturing limitations without sacrificing style or quality. Larger companies also are integrating these departments, but it's a slower process because they are so big."

Assembly — Packard's assembly line is one of the shortest in the industry. Many units normally put together on the final line are prefabricated. Mr. Rienecke says this saves time and gives workers a chance to correct mistakes during final assembly. A rejection rate which is 25 per cent lower than that of Packard's old plant proves the system is effective.

Mr. Rienecke points out that the Conners plant was one of the first to embrace modern concepts of stock control. Older assembly lines had parts stocked on one side only because of limited space. Workers on the far side had to cross the line to get parts. This was costly and time consuming. New plants, built on one or two levels, have stock bins on each side of the line.

Stock Control—Easy access to storage areas allows parts to be brought in as they are needed without interfering with assembly operations. Such layout means that the plant only has to maintain about a three-day inventory of parts.

Citing an example, Mr. Rienecke says: "On inner door trim panels alone, we keep between 75 and 80 different color combinations and styles on hand. Even a three-day inventory adds up to a lot of space."

Quality—"The plant's physical layout aids in making workers' jobs as easy as possible," Mr. Rienecke reports. He believes this is a major key to quality. Simplification of assembly operations and time to correct defects as they appear make for near-perfect cars.

Packard has a tough test track at the end of the assembly line. Each car is checked out for bumps, shakes and rattles. Ford's Continental Mark II has a similar setup, but most companies just make spot check road tests during assembly.

Product Mix—With this flexibility, the plant can turn out Packards, Clippers and Executives in just about any proportion desired.

Studebaker-Packard says output of the new model is stabilized at 35 per cent of total plant capacity. Based on current production figures from *Ward's Automotive Reports*, this means an estimated 1800 Executives have been built since the car went into production on Mar. 5. The company's future hinges in part on how well it sells.

History — Studebaker-Packard has run the gamut of manufacturing ills. When James Nance, primarily a merchandising expert, took over as president of Packard in 1952, he faced outmoded manufacturing facilities and bad management relationships.

By 1954, he had moved Packard's assembly line from its 50-year-old plant into new quarters at Conners avenue. This move resulted in unit cost savings up to 60 per cent for some operations. A shakeup among executives brought about healthier management policies. Meanwhile, sales and capital were running downhill.

The merger with Studebaker late in 1954 brought in more working capital, but in 1955, Studebaker suffered from poor styling and disastrous labor problems. By the time they were corrected, combined S-P sales had dwindled. Merchandising, Mr. Nance's specialty, is the firm's big unsolved problem today. It needs money to correct this.

Finances — Studebaker-Packard lost $29.7 million last year and almost an equal amount in 1954 after its merger. It has committed $20 million of a $45-million bank credit.

In a rocky shareholders meeting a few weeks ago, Mr. Nance admitted: "The new financing to be negotiated early in the year did not materialize as expected . . . Up to the present, additional financing has not been arranged."

To date, Packard production is running 65 per cent below 1955's. Studebaker is down about 30 per cent. The industry's average is 20 per cent lower than last year's. Mr. Nance has said: "Our factory sales to dealers thus far in 1956 have been unsatisfactory."

The company has to capture about 2 per cent of the market to break even. Last year, its share was 0.86 per cent.

Solutions — Company officials have indicated that a merger would be a feasible solution. Rumors as to possible candidates have included Ford Motor Co., American Motors Corp., several aircraft companies—even J. C. Penney Co.

Studebaker-Packard feels that anyone buying it would receive substantial tax credits as well as the manufacturing facilities. The company also is rumored to be trying to pick up more defense contracts.

In any event, short term loans or an ultimate merger probably will insure the introduction of 1957 models.

S-P's immediate concern is to get enough money to bolster its sagging dealer structure. If it can do this, the Executive may have a chance to prove itself in the 1956-57 sales race.

U. S. Auto Output

Passenger Only

	1956	1955
January	611,190	659,508
February	554,801	674,951
March	575,559†	792,436
1st Qtr.	1,741,550†	2,126,895
April		752,245
May		723,868
June		648,412
July		658,696
August		613,705
September		460,443
October		517,788
November		749,061
December		682,256
Total		7,933,369

Week Ended	1956	1955
Mar. 24	131,287	178,068
Mar. 31	125,850	177,295
Apr. 7	133,354	168,002
Apr. 14	136,038	175,133
Apr. 21	131,654†	180,647
Apr. 28	128,000*	184,279

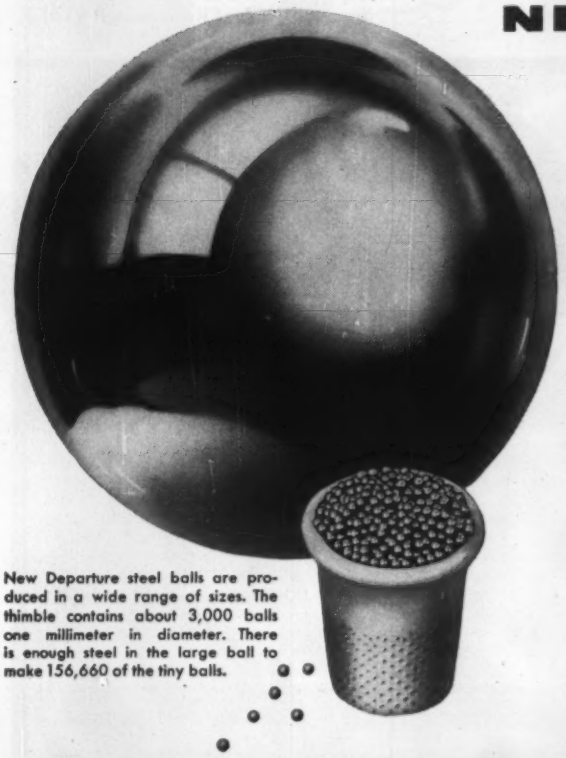
Source: *Ward's Automotive Reports*
†Preliminary *Estimated by STEEL

FACTS

about

NEW DEPARTURE

STEEL BALLS



New Departure steel balls are produced in a wide range of sizes. The thimble contains about 3,000 balls one millimeter in diameter. There is enough steel in the large ball to make 156,660 of the tiny balls.

Available in any quantity to fit your specifications for grade, size and accuracy!

When industry wants steel balls of proven accuracy and dependability, it is only natural that they turn to New Departure, leading producer of ball bearings and therefore thoroughly experienced in the manufacture of precision balls. Today, New Departure provides industry with high-carbon chrome and stainless steel balls in a wide range of sizes and specifications.

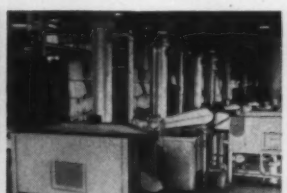
New Departure balls are produced from the finest high-carbon chrome steel. AISI Type E51100 steel, specially made for New Departure, is heat-treated to achieve the proper hardness and toughness for maximum strength and life in the finished product. Stainless steel, AISI Type 440C, used by New Departure results in balls of much improved hardness and load-carrying ability.

In addition to producing the finest steel balls available, New Departure will fill volume orders for balls of special materials such as high-nickel or cobalt-base alloys, tool steel and others.

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONN.

Steel ball wire is drawn through dies to assure uniform diameter and roundness.

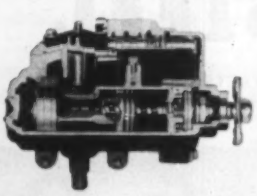
Precise control of grain flow is obtained with these Ball Heading Machines.



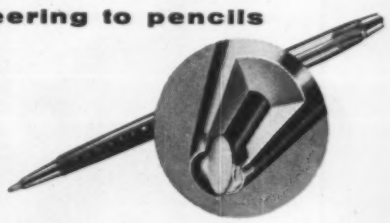
Balls are heat-treated, quenched in oil or water, then tempered in electric furnaces.

These gauges sort balls into lots according to required diameter limits.

Applications range from power steering to pencils



The unique advantages of New Departure steel balls are utilized in many applications ranging from heavy-duty bearings to the new liquid lead pencil. To accommodate these applications, New Departure steel balls are offered in sizes ranging from .025 inch to 1⅞ inches in diameter.



The steel that could take anything but a bath

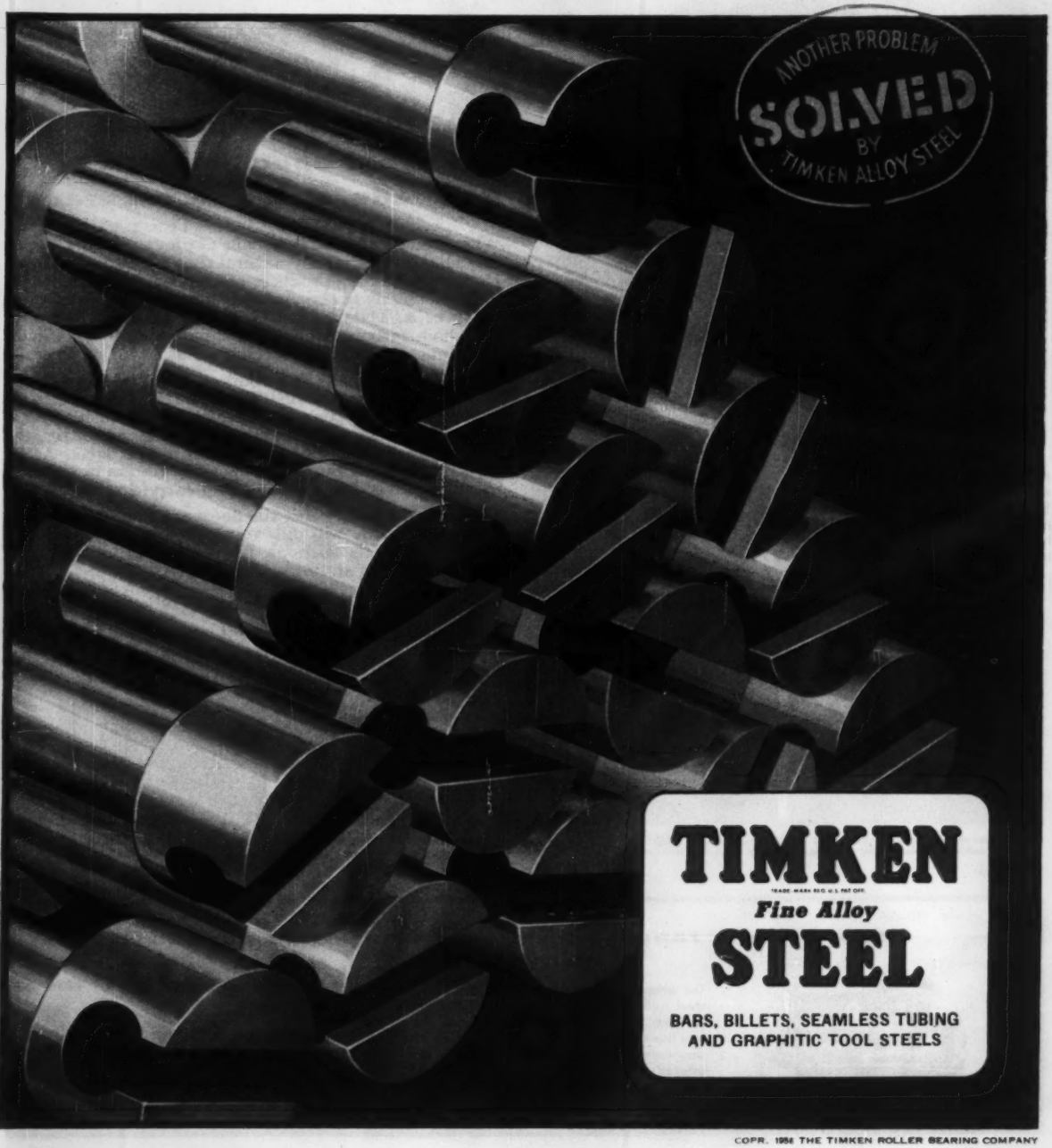
IN steel mills and warehouses, a roller leveler straightens wide sheets and heavy plates between powerful steel rolls and shoots them out flat and level.

As you can imagine, the stress on the rolls is tremendous. To make them strong enough and tough enough, one roll manufacturer was using an alloy steel, 52100. Then to make the rolls *hard* enough, they were heated to a high temperature and quenched in a liquid bath. But the severe quench was causing many of the rolls to warp.

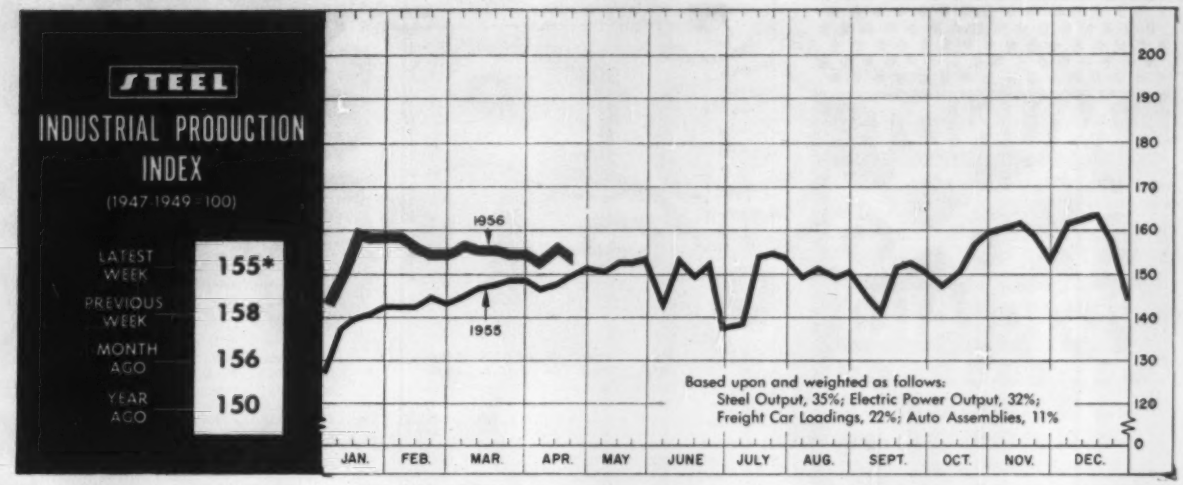
The roll maker brought his problem to metallurgists of the Timken Company. "Could rolls be made from 52100 steel that wouldn't distort in quenching?" Their considered answer: Yes—if the steel were uniform, from lot to lot, in analysis and hardenability.

So the roll maker changed to 52100 steel made by the Timken Company. They found the steel *was* uniform—lot to lot . . . heat to heat . . . year in, year out. The roll maker was able to standardize his heat-treating practice. Since the change to Timken steel, distortion has been practically eliminated.

Our files bulge with scores of problems that have been "Solved—by Timken Alloy Steel". Can we help solve a steel problem for you? Write: The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable: "TIMROSCO". Tapered Roller Bearings, Alloy Steels and Seamless Tubing, Removable Rock Bits.



COPR. 1954 THE TIMKEN ROLLER BEARING COMPANY



*Week ended Apr. 21

Full Employment Will Keep Business Up

A HIGH LEVEL of employment in the first quarter was just a prelude to even fuller employment in the second quarter and most of the remainder of the year—barring a major steelworkers' strike. Whether this is the cause or result of good business is in the category of the chicken-egg puzzle, but, inevitably, the two go together.

The latest figures from the Labor and Commerce departments put total civilian labor force at 65.9 million and total employment at 63.1 million in March. Look for both figures to rise by June. Reason: At that time thousands of students will enter the labor market, and seasonal job openings will be filling fast. Translated into business terms, this means more productive hands, more goods produced and more spending money.

Across the Board—The increase is being shared by most phases of business, the glaring exceptions being the automotive and agricultural implement industries. The downtrend in autos has stopped, but the slump in farm tools has just begun. Nevertheless, nonfarm employment in March was 49.8 million, 241,000 greater than the month before. Metalworking industries (see chart, page 78) showed signs of better times as the seasonal decline nearly came to a halt. Later figures should reveal a pickup.

Employment in the iron and steel industry is record bound. February was the best month since November, 1953 (see chart, page 79), and the industry has increased the tempo of operations since then. February's payroll, according to the American Iron & Steel Institute, was the highest for any February on record. Monthly records for March and April are almost sure to fall as the industry pushes its facilities to theoretical capacity and beyond prior to labor negotiations.

More Money — Record employment means record wages. February's steel industry payroll just

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,454[1]	2,466	2,307
Electric Power Distributed (million kw-hr)	10,900[1]	10,918	9,697
Bituminous Coal Output (1000 tons)	10,045[1]	8,640	8,413
Petroleum Production (daily avg—1000 bbl)	7,150[1]	7,156	6,832
Construction Volume (*ENR*—millions)	$536.4	$529.8	$382.8
Auto, Truck Output, U. S., Canada (*Ward's*)	169,576[1]	175,678	225,074
TRADE			
Freight Car Loadings (1000 cars)	715[1]	742	706
Business Failures (Dun & Bradstreet)	252	255	204
Currency in Circulation (millions)[3]	$30,290	$30,300	$29,714
Dept. Store Sales (changes from year ago)[3]	+11%	−15%	−13%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$23,088	$20,479	$20,873
Federal Gross Debt (billions)	$276.0	$276.0	$277.0
Bond Volume, NYSE (millions)	$23.9	$23.8	$23.7
Stocks Sales, NYSE (thousands of shares)	11,635	12,937	14,472
Loans and Investments (billions)[4]	$85.4	$85.5	$84.8
U. S. Govt. Obligations Held (billions)[4]	$27.7	$27.6	$22.5
PRICES			
STEEL's Finished Steel Price Index[5]	209.10	209.10	194.53
STEEL's Nonferrous Metal Price Index[6]	277.7	278.0	237.3
All Commodities[7]	113.5	113.4	110.3
Commodities Other Than Farm & Foods[7]	121.4	121.3	115.8

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1956, 2,461,893; 1955, 2,413,278. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100

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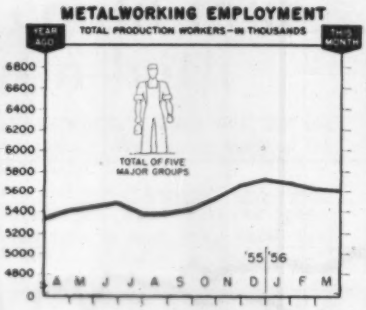
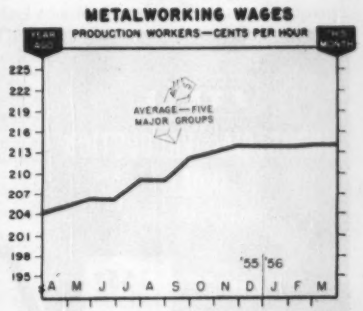




1955	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
Mar.	1,057	860	1,144	803	1,447
Apr.	1,076	868	1,164	804	1,462
May	1,096	877	1,174	809	1,456
June	1,115	884	1,182	816	1,447
July	1,098	863	1,160	802	1,420
Aug.	1,112	877	1,155	818	1,379
Sept.	1,134	894	1,149	855	1,357
Oct.	1,135	904	1,194	885	1,378
Nov.	1,151	912	1,213	870	1,484
Dec.	1,160	908	1,236	872	1,511
1956					
Jan.	1,160	892	1,248	856	1,488
Feb.*	1,161	882	1,263	850	1,429
Mar.*	1,160	882	1,266	835	1,435

*Preliminary

U. S. Bureau of Labor Statistics
Charts copyrighted, 1956, STEEL

1955	Prim. Mtls.	Fab. Prod.	Mach- inery	Elec. Mchy.	Trans. Equip.
Mar.	216	195	205	185	221
Apr.	217	195	206	186	220
May	218	196	207	187	222
June	220	196	208	187	219
July	228	199	208	188	223
Aug.	227	199	209	187	224
Sept.	233	201	211	189	226
Oct.	231	202	213	190	228
Nov.	231	202	214	191	231
Dec.	232	203	216	192	228
1956					
Jan.	233	203	217	192	224
Feb.	231	203	217	193	224
Mar.*	232	204	218	193	224

*Preliminary

U. S. Bureau of Labor Statistics

missed the record set in December, 1955, by about $13.3 million, even though there were two days less work. March will see a new record, which probably won't stand long, either. The average hourly rate in the five basic metalworking industries in the chart above remained at $2.14.

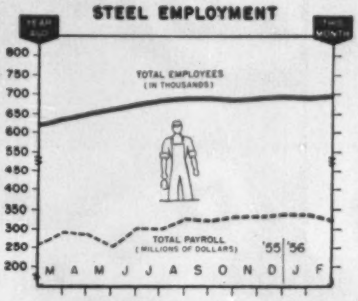
It is significant that only four persons out of every 100 in the labor force are out of work. Perhaps as many as two of the four do not want to work. With the opening up of more out-of-door jobs in spring and summer, unemployment is being reduced. The Labor department's Bureau of Employment Security reports that the number of workers covered by state unemployment insurance dropped by 52,100 during the week ended Mar. 31. This was the fifth straight week showing an improvement and leaves the number so covered at only 1,370,000.

FRB Index Edges Down

The Federal Reserve Board's industrial production index for March (see chart, page 79) showed a decline to 142 (1947-1949 = 100) from February's 143 on a seasonally adjusted basis. The board points out that there was an increase in production during the period, but because it was less than seasonal, the index was adjusted downward. A big part of the difference between the index and the general level of business comes in the service, or nonproductive, industries. The tremendous rise of such businesses as television repair is not reflected in any production index, but they have filled the gap.

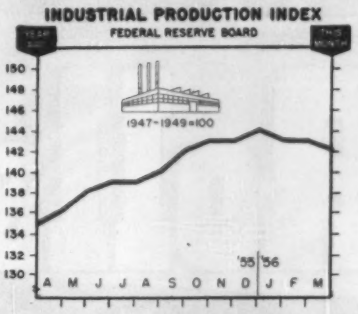
Car Loadings Skyrocket

STEEL's industrial production index got a shot in the arm during the week ended Apr. 14 and then settled back a bit the following week. Mainly responsible for the 158 reading in the former week (1947-1949 = 100) was the strong showing in freight car loadings. The opening of the iron ore season boosted the figure to 742,053, which the Association of American Railroads says is the highest since the week ended Apr. 19, 1953. A new weekly record in the steel industry (2,483,000 net tons for ingots and castings, says AISI) also contributed. Both electric output



	Employment In Thousands		Payroll In Millions	
	1956	1955	1956	1955
Jan.	681	605	$329.1	$258.8
Feb.	684	616	317.3	255.1
Mar.	...	630	....	288.2
Apr.	...	643	....	282.0
May	...	654	....	249.1
June	...	667	....	298.4
July	...	676	....	296.8
Aug.	...	680	....	320.7
Sept.	...	680	....	317.1
Oct.	...	678	....	325.1
Nov.	...	680	....	326.1
Dec.	...	682	....	330.6

American Iron & Steel Institute



(seasonally adjusted)

	Total Production		Primary Metals		Metal Fabricating	
	1956	1955	1956	1955	1956	1955
Jan.	143	132	148	127	170	157
Feb.	143	133	148	131	168	157
Mar.	142*	135	146*	136	167*	160
Apr.	...	136	...	138	...	160
May	...	138	...	140	...	162
June	...	139	...	143	...	163
July	...	139	...	134	...	167
Aug.	...	140	...	139	...	170
Sept.	...	142	...	146	...	171
Oct.	...	143	...	148	...	173
Nov.	...	143	...	149	...	172
Dec.	...	144	...	151	...	172
Avg.	...	138	...	140	...	165

Federal Reserve Board. *Preliminary

and auto production were above the previous week, but not so spectacularly as loadings and steel. For the week ended Apr. 21, the four elements in the index were slightly lower, resulting in a preliminary reading of 155.

Railroads Add Equipment

The nation's railroads took delivery of 5949 new freight cars last month, the highest total since November, 1953. While new orders continued far below the late-year rush of 1955, backlogs still stand at 137,070 cars—enough to make a freight train stretching from St. Louis to New York City. Last month, Class I railroads also installed 399 diesel-electric locomotives in service. The backlog of new locomotive units is 859, compared with only 428 a year ago.

Equipment Makers Happy

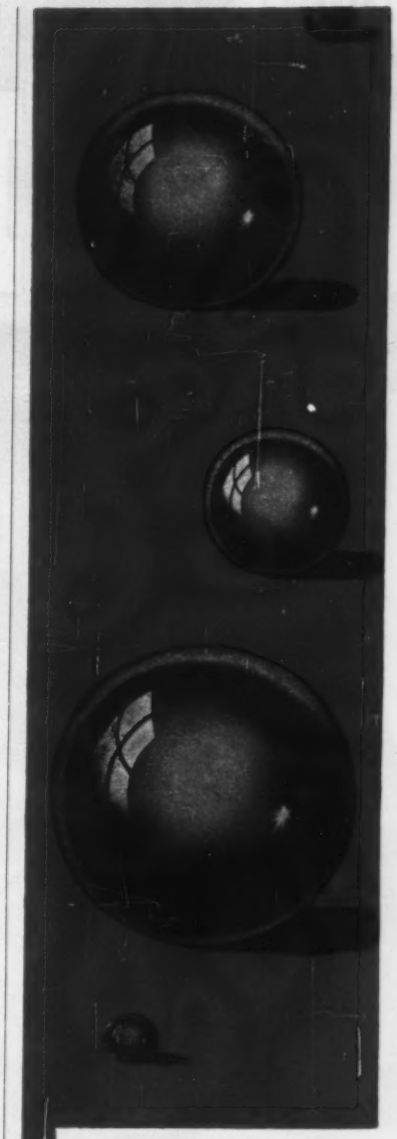
Heavy equipment makers continue to report near-record business. The American Supply & Machinery Manufacturers' Association Inc. says its index for March was 206.73 (July, 1948 = 100), up 10.85 points over the February reading. That's the highest level since April, 1951. Indicative of the rate at which new orders are coming in is the report from Blaw-Knox Co. that its backlog increased from $111 million to $125 million during the first quarter.

The machine tool industry increased its backlog of orders in March to 8.6 months, compared with 8.5 months in February. The new order index hit 322.7 (1945-1947 = 100), and shipments reached $74,150,000, the highest total since June, 1954.

Trends Fore and Aft

• March business failures, as reported by Dun & Bradstreet Inc., rose 14 per cent to 1170, the highest monthly total since March, 1941. But liabilities decreased 13 per cent, indicating that the picture is not so dark as it appears.

• Chevrolet Division of General Motors Corp. reportedly has reduced its May-June production schedules 8 per cent below original goals because of the slow springtime demand, says *Ward's Automotive Reports.*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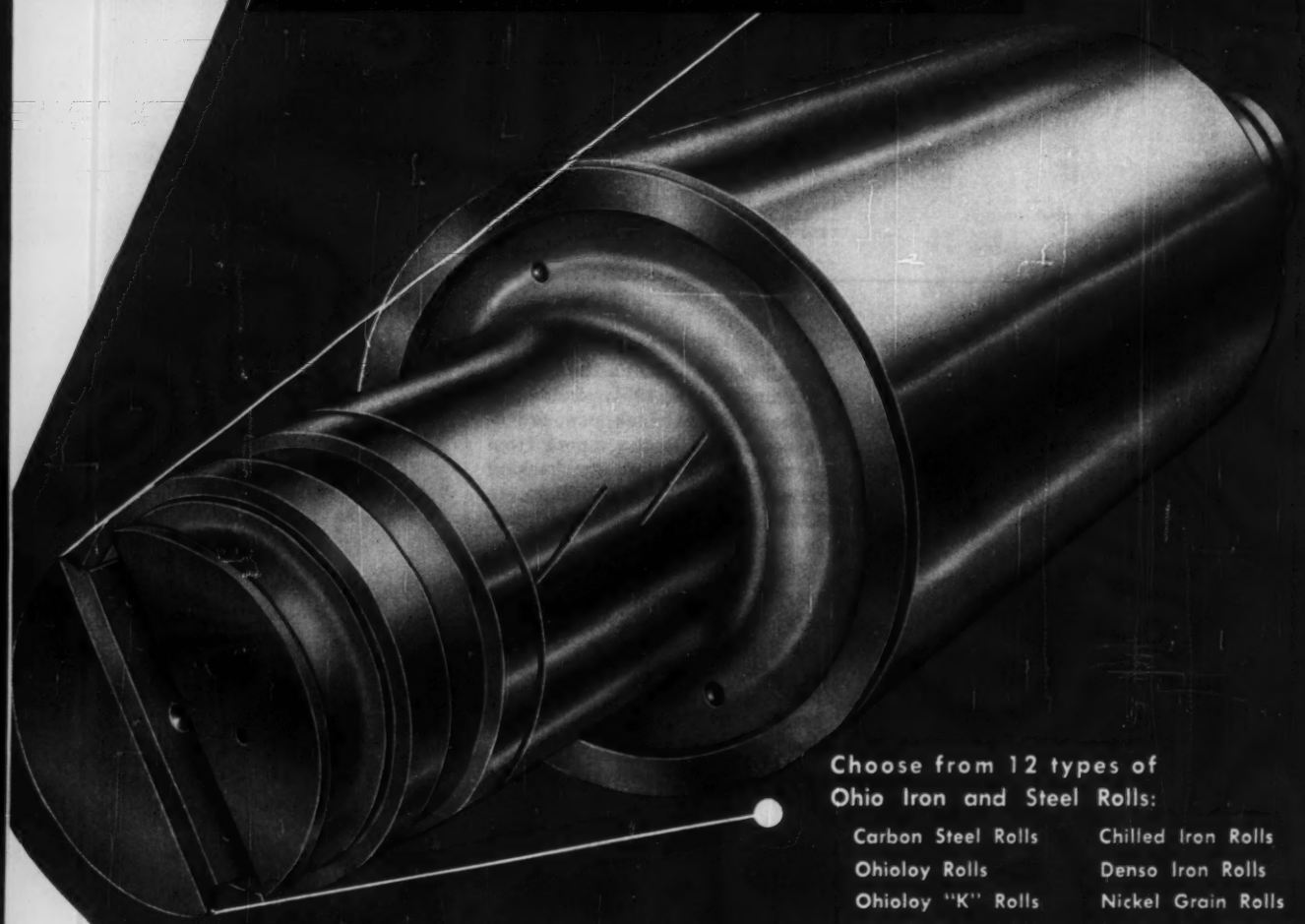

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CHARLES L. HOLBERT
. . . operating head of Porter

ANDREW F. KRITSCHER
. . . Kaiser Aluminum engineering mgr.

AMBROSE J. WARDLE JR.
. . . president of McKay Machine Co.

Charles L. Holbert was appointed executive vice president, **H. K. Porter Company Inc.**, Pittsburgh. He succeeds **Clarence R. Dobson**, retired, who will serve as a consultant. Mr. Holbert joined Porter earlier this year as a vice president. He formerly was executive vice president of Southern Pacific Milling Co. and previously served Johnson Pump Co. as vice president-general manager.

Edgcomb Steel & Aluminum Corp., Hillside, N. J., elected **L. R. Edgcomb** vice president-sales; **J. J. McGonagle**, general sales manager; **W. F. Lynch**, manager of inside sales; **H. D. Ammerman**, office manager; and **A. W. Schriewer**, product manager, stainless steel.

C. C. Brandon, director of production control and purchasing at the Rochester, N. Y., products division of **General Motors Corp.**, was named works manager. **J. S. Matthews** becomes production manager.

R. G. Archie was elected president and chairman of **Tru-Arc Inc.**, San Diego, Calif.

Peter J. Kohler was made sales engineer, industrial division, **Modine Mfg. Co.**, Racine, Wis. He was product design engineer, dealing primarily with the heating and air conditioning division.

Andrew F. Kritscher was made manager of engineering for **Kaiser Aluminum & Chemical Corp.**, Oakland, Calif. He was with United States Steel Corp.

Eugene R. Kramer was elected president, **United Screw & Bolt Corp.**, Cleveland. He has been with the company 25 years and vice president since 1948.

W. S. Mahoney, effective July 1, will succeed **J. E. Adams** (retiring) as vice president and general manager of **Ramsey Corp.**, St. Louis, a subsidiary of Thompson Products Inc. Mr. Mahoney, formerly executive vice president of Tyson Bearing Corp., has joined Ramsey as a vice president.

R. A. Entringer was made general manager of **Alcaloy Inc.**, Trenton, N. J. He was general sales manager.

John E. Feldhaus fills the new post of manager-marketing research at **Winchester-Western Division**, Olin Mathieson Chemical Corp., New Haven, Conn. **Richard S. Reed** succeeds Mr. Feldhaus as assistant to the vice president and general manager.

Vern C. Vanderbilt Jr., formerly on the faculty of Purdue University, joined **Perfect Circle Corp.**, Hagerstown, Ind., as chief research engineer.

Ambrose J. Wardle Jr. succeeds **Harvey D. Miller**, retired, as president of **McKay Machine Co.**, Youngstown. Mr. Wardle was assistant president and vice president-sales. Mr. Miller will serve in a consulting capacity. **D. Myron Davis** was elected vice president-treasurer and **Frank H. Dreher** secretary.

Frank Kovich was made general manager, **Milwaukee Valve Co.**, Milwaukee, subsidiary of Controls Corp. of America. He is also vice president of the parent company and director of manufacturing for its A-P Controls Division.

Emlyn Lloyd was made operating head of **Chrysler Corp.'s** purchasing activities at Detroit. **Joseph Pfeiffer**, director-purchases since 1947, will retire in August. Mr. Lloyd was general purchasing agent.

Horace B. Horton was elected chairman of **Chicago Bridge & Iron Co.**, Chicago. He is succeeded as president by **Ernest E. Michaels**, formerly executive vice president. **C. S. Pillsbury** was elected vice president-secretary; **A. B. Horton**, vice president-treasurer. **George E. Borst**, New York district sales manager, was elected vice president.

James Steele was made assistant manager, stainless and alloy steel

GAVIN A. CULLEN
. . . gen. mgr. of IBM's San Jose plant

JAMES FREESE
. . . gen. production mgr. at Timken

AL W. ROTH
. . . mgr. of new Aerovent Fan div.

sales, **Sharon Steel Corp.**, Sharon, Pa.

International Business Machines Corp. appointed **Gavin A. Cullen** general manager of its new San Jose, Calif., plant, soon to be constructed. Present San Jose operations are scheduled to move into the new facilities late this year. Mr. Cullen was general manager of IBM's Kingston, N. Y., military products center. He is succeeded by **Robert P. Crago. Richard J. Whalen** was named assistant general manager at the Kingston facility and **Harold D. Ross** manager of engineering.

James G. Kennedy was made vice president-general manager, **American Electric Motors**, Toledo, O. He was manager of Mitchell-Bentley Corp.

Minnesota Mining & Mfg. Co., St. Paul, appointed **F. Lindsay Power** division engineer and **Vincent Meyer** assistant division engineer for coated abrasives.

Ralph L. Clark was made supervisor, stainless steel fabricating department, **Portland Copper & Tank Works, Inc.**, South Portland, Me.

Carondelet Foundry Co., St. Louis, elected **Roy A. Jacobsen** executive vice president; **John H. Culling**, vice president-plant operations; **Warren W. Brown**, vice president-sales; and **Milton W. Stanze**, secretary-treasurer.

James Freese was made general production manager of all plants of **Timken Roller Bearing Co.**, Canton, O. He succeeds **James Reid**, retired. **Charles L. Richey** succeeds Mr. Freese as assistant general production manager. He was production manager, Canton bearing division.

Penn Metal Co. Inc., New York, appointed **Maurice K. Brown** general sales manager. He was assistant general sales manager.

Paul A. Barkmeier, formerly a vice president of Radio Corp. of America, joined **Borg-Warner Corp.** in the newly created post of director of marketing services.

Cooper Alloy Corp., Hillside, N. J., promoted **Joseph L. Lessman** to plant manager, foundry division, and **Albert Reichers** to plant manager, stainless engineering and machine works division.

Lone Star Steel Co., Lone Star, Tex., promoted **William Whitfield** to administrative assistant to the general superintendent of its E. B. Germany Works. **Jeremiah Sheehan** succeeds Mr. Whitfield as assistant superintendent of Lone Star's rolling mills.

James E. Herbert was elected vice president-sales, **Hoffman Electronics Corp.**, Los Angeles.

S. W. Crisman was made Pittsburgh district manager, **Elliott Co.** He succeeds the late **J. H. Strickler.**

Al W. Roth was appointed manager of the new large propeller division of **Aerovent Fan Co. Inc.**, Piqua, O. He has served in a sales engineering capacity for the company in the Southwest and continues offices at Tulsa, Okla., as well as at Piqua.

Clark Hague, formerly with Askania Regulator Co., now heads **Hague Regulator Corp.**, Orangeville, O.

William O. Faxon was elected president of **Tracerlab Inc.**, Boston. He succeeds **William E. Barbour Jr.**, now chairman. Mr. Faxon was executive vice president. **Malvern J. Gross** was elected vice president-general manager, Keleket X-Ray Division, and will assume his duties soon. He is currently vice president and director of engineering of Ritter Co.

Lauren C. Dudley was made Houston district sales manager, metal division, **Continental Can Co.**

Fairbanks, Morse & Co. appointed **L. A. Weom** manager of its pump sales division with headquarters at Kansas City, Kans. He was manager of materials and schedules at the Beloit, Wis., Works, and is succeeded by **J. R. Walsh. G. R. Anderson** succeeds Mr. Walsh as manager of the Kansas City pump works. **A. H. Hoffman** was made manager of the electrical works at Freeport, Ill., replacing Mr. Anderson. **V. E. Johnson** succeeds Mr. Hoffman as man-

Non-Habit-Forming

Pressure gage courtesy J. E. Lonergan Co., Philadelphia 6, Pa.

Beryllium Copper Tubing by Superior

This unusual term describes perfectly one of the most important properties of beryllium copper tubing. The Bourdon tube shown above is an excellent example. Once the beryllium copper tube is in the gage, it "remembers" its job and acquires no new habits. It yields constantly to pressure and as constantly returns to its original position without taking a new "set."

Beryllium copper tubing by Superior has this and many other important characteristics to a marked degree, such as hardenability, corrosion and fatigue resistance, thermal and electrical conductivity. It is easy to fabricate, it is nonmagnetic.

Beryllium copper tubing lends itself to a wide variety of applications. It can be severely worked to form convoluted flexible waveguides and bellows. Cold drawn to specifications, followed by proper hardening, it makes an excellent aircraft antenna, with the strength to withstand thousands of hours' vibrating in 100 mph winds. Used as a contact roll in a business machine collator, it is wear and corrosion-resistant, and a good electrical conductor. Or, as above, shaped for use as a Bourdon tube, it is tough, ductile, durable—and holds its original shape.

Superior produces tubing in over 63 analyses . . . in stainless, alloy and carbon steels, nickel and nickel alloys, beryllium copper, titanium and zirconium. Let Superior's tubemanship and experience help you solve your tubing problems. You'll like the service and the products—they *are* habit-forming. Send for your free copy of Data Memorandum No. 7 on beryllium copper tubing. Write Superior Tube Company, 2005 Germantown Ave., Norristown, Pa.

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All analyses .010 in. to ⅜ in. OD—certain analyses in light walls up to 2½ in. OD

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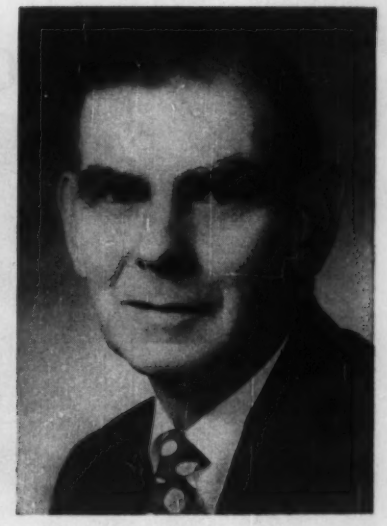
WILLIAM K. LOMBARD
. . . Thermal Research v. p.-sales mgr.

PETER P. SOMERVILLE
. . . gen. mgr. at J&L wire rope div.



MILTON E. TRUEMAN
. . . Chrysler engine div. plant mgr.

ager of the Westco pump works in St. Louis.

William K. Lombard was promoted to vice president and sales manager, **Thermal Research & Engineering Corp.**, Conshohocken, Pa. He has been with the company since 1949 and was made sales manager in 1953.

Clarence L. Johnson, chief engineer, fills the new post of vice president for research and development at **Lockheed Aircraft Corp.**, with offices at the Burbank, Calif., plant.

Alpha Williams Jr. was named vice president and general manager, **Truedale Steel Corp.**, San Diego, Calif.

Edward M. Welty was made eastern district manager for **H. M. Harper Co.** He will supervise sales on the eastern seaboard as well as warehouse facilities at Mamaroneck, N. Y.

Frederic B. Stevens Inc., Detroit, appointed **Gene Passman** to head foundry facing sales.

Peter P. Somerville was appointed general manager of **Jones & Laughlin Steel Corp.'s** wire rope division at Muncy, Pa. He was plant manager. **Ivan N. Latimer** was made assistant general manager. At the blast furnace department of J&L's Aliquippa, Pa., Works, **Therman B. Duckworth** was made assistant superintendent to succeed **A. T. Sadler**, now superintendent of the blast furnace department.

William A. Marquard Jr. was elected vice president-administration of **Mosler Safe Co.**, New York. He was assistant to the president, and previously served as director of research and engineering.

Alvin E. York was made manager of parts and service and **Alva L. Arend** parts supervisor of **Clark Equipment Co.'s** construction machinery division, Benton Harbor, Mich.

L. B. Foster Co. appointed **Stanley Kapp** general superintendent of plant facilities with headquarters in Chicago. He was superintendent of the Chicago plant.

At **Chrysler Corp.'s** new engine division, Mound road, Detroit, **Milton E. Trueman** was named plant manager; **J. F. Anderson**, manager of production engineering; **Donald R. Kinker**, divisional chief engineer; **Marvin G. Simmons**, purchasing supervisor; **Harry R. Bentley**, manager of production planning; and **John P. Horgan**, manager of administration and organization.

Howard A. Stai was made manager, tubular steel products and cold-finished steel bar sales, at the Seattle steel service plant of **Joseph T. Ryerson & Son Inc.**

William L. Cressman, former manager of eastern sales for Armco Steel Corp., was appointed assistant general manager-product divisions for **Jones & Laughlin Steel Corp.**, Pittsburgh.

Harold A. Jones was made national sales manager, **Motorola Communications & Electronics Inc.**, Chicago, subsidiary of Motorola Inc. He was executive assistant to the national sales manager.

OBITUARIES . . .

James P. Lawrence, 66, chairman, **American MonoRail Co.**, Cleveland, died Apr. 22.

L. W. Deutsch, 54, in charge of the industrial lubrication section of **Aro Equipment Corp.**, Bryan, O., died Apr. 13.

W. Hartwell Irwin, 81, president, **Irwin Elevator Co. Inc.**, Albany, N. Y., died Apr. 9.

Walton E. Zippler, 57, president, **National Machine Works**, Atlantic City, N. J., died Apr. 11.

Sterling M. Gardner, 70, founder of **Gardner Electric Mfg. Co.**, a subsidiary of Federal Pacific Electric Co., Emeryville, Calif., died Mar. 25.

The Case of the Costly Casting

PROBLEM:
A manufacturer recently found the cost of machining a certain cast iron part had become prohibitive. How could costs be reduced?

SOLUTION:
Investigation showed aluminum permanent mold castings of the same shape would reduce machining time about 10%. But Bohn engineers went several steps further. Working closely with the manufacturer, they re-engineered the job and re-designed the cast shape. This eliminated five machining operations.

RESULT:
Machining time was reduced 80%.

BOHN
ALUMINUM & BRASS CORPORATION
1400 LAFAYETTE BLDG.
DETROIT 26, MICHIGAN

Since this ad last ran . . .

A year ago, the above ad told how Bohn engineers helped a manufacturer reduce machining time 80% on one part. Since then Bohn has helped reduce his costs even more. Through familiarity with the part's function in the end product, Bohn engineers suggested redesign improvements. Pilot testing by the customer's Engineering Department, proved the soundness of the design. Result: the actual cost of the part was further reduced 10%.

BOHN

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—an international standard
for pickling acid inhibitors

- Metal savings range from 5 to 15 pounds per ton of steel pickled.
- Acid savings range from 3 to 30 pounds per ton of steel pickled.
- Baths can be operated longer and less acid is required to keep them at desired concentration—costs of charging and cleaning are reduced, less handling and storing of acid is required, and there is less spent liquid to be disposed of.
- Rejects are reduced—steel pickled in acid inhibited with Rodine comes out of the bath with uniformly smooth, bright clean surfaces, free of pits, blisters and smut.
- Many alloy steels can be pickled in the same bath with low-carbon steels without either becoming discolored—and both get complete protection.
- Rodine is stable at any pickling temperature.
- Rodine requires no premixing, is available in powdered and liquid form, foaming and non-foaming types, in a number of grades designed for the many requirements of sulfuric, muriatic and phosphoric acid pickling.

For the complete story, send for "Efficient Pickling with Rodine."

AMERICAN CHEMICAL PAINT COMPANY, Ambler 19, Pa.
Detroit, Mich. • Niles, Calif. • Windsor, Ont.

CHEMICALS ACP PROCESSES

Modernization program at American Brass Co. . . .

Boosts Coil Handling Weights

COPPER AND BRASS strip is being produced in larger tonnages and more efficiently at American Brass Co.'s plant in Kenosha, Wis. A modernization program has increased mill speeds and raised the limit on coil weights from 800 to 3000 lb (believed to be tops in the industry).

The program was undertaken in co-operation with the Rolling Mill Division of E. W. Bliss Co., Salem, O. It was done in three stages.

Bliss Equipment—First step was to substitute new Bliss entry and delivery equipment for the coil handling facilities on the breakdown mills, which had imposed the 800-lb coil limit. This, plus the addition of semiautomatic conveyor systems installed by Bliss, has enabled the Kenosha Division to roll strip from 3000-lb bars. During the equipment installation on these two mills, Bliss rebuilt one of the mills.

The modernized breakdown mills now produce longer and heavier coils, making it practical to convert two of three older one-way mills to reversing—increasing output from each. Bliss designed and built new belt wrappers, coil buggies and other handling equipment.

The final step was the installation of a Bliss, 5-stand, half-width tandem mill (shown above) to handle the increased output of the older mills. This mill is especially suited to Kenosha's requirements for producing thin-gage copper and brass strip used in making automobile radiators.

Offers To Buy Globe Iron

Interlake Iron Corp., Cleveland, will acquire, subject to stockholders' approval, the assets and properties of Globe Iron Co., Jackson, O. The transaction includes majority interest in Globe Metallurgical Corp. Globe Iron operates a blast furnace and an electric furnace at its Jackson plant and owns iron ore properties in Michigan.

Cleveland Firm Buys Grindle

C. O. Bartlett & Snow Co., Cleveland, producers of sand, mold and casting handling equipment, purchased the assets of Grindle Corp., Harvey, Ill. The Illinois company will operate as a division of Bartlett & Snow's foundry equipment department. The Grindle Foundry Division will continue activities at its present location until suitable facilities can be provided in Cleveland. Judson H. Gougler will continue as chief engineer and John Donaldson as manager.

Alan Wood Builds Ore Bridge

Alan Wood Steel Co., Conshohocken, Pa., will build an ore bridge for its blast furnace department at a cost of about $1.3 million. Scheduled for completion in 1957, the bridge will be equipped with a bucket that has a capacity of 15 gross tons. The bridge to be replaced (built in 1917) has a 7½-gross-ton bucket.

Will Build Refractories Plant

Harbison-Walker Refractories Co., Pittsburgh, will build a basic refractories plant at Hammond, Ind. It will have one tunnel kiln, and additional kilns will be added as needed. Products will include fired, chemically bonded and metal encased brick, and ramming mixes.

Alcoa Renames Research Lab

Aluminum Co. of America has changed the name of its research laboratories at New Kensington, Pa., to Alcoa Research Laboratories. It was known as Aluminum Research Laboratories. The company says the change is in keeping with the expansion of interests to fields other than aluminum, such as alumina and chemicals, gallium, titanium and magnesium.

Penn Power To Expand Plant

Babcock & Wilcox Co. will furnish the boiler and Westinghouse Electric Corp. the main transformers and turbogenerator for a $16.4-million addition being started this month at Pennsylvania Power Co.'s West Pittsburgh, Pa., plant. The expansion will add 90,000 kw, to bring the plant's capacity to 263,000 kw.

Kaiser Division Gets Rail Order

Kaiser Steel Corp.'s Fabricating Division at Montebello, Calif., has been awarded a $1-million contract for the manufacture of 1000 railroad freight car underframes for the Pacific Fruit Express Co. The

contract calls for delivery of nine underframes a day beginning in mid-October. About 125 employees will be added to the production department.

Ohio Firm Builds Tube Mill

Mahoning Valley Steel Co., a subsidiary of General Electric Co., is building a steel tube mill at its Niles, O., sheet mill. The new mill, employing about 50, will be in operation later this year.

Builds Titanium Pigment Plant

Canada's first titanium pigment plant is being constructed at Varennes, Que., by Canadian Titanium Pigments Ltd., a subsidiary of National Lead Co., New York. The project will cost $15 million.

Garrett Opens New Offices

Garrett Corp., Los Angeles, producer of aircraft components and accessories, opened new offices for its Aero Engineering Division in Detroit and Cincinnati. Aero Engineering is sales representative for Garrett's manufacturing divisions and other eastern manufacturers. Thomas F. Kulow will be in charge of the Detroit branch; C. E. Gunther, the Cincinnati operation.

Purdy Buys Korhumel Plant

A. R. Purdy Co., distributor of steel, aluminum and magnesium mill products in the New York-Connecticut area, has acquired the Bridgeport, Conn., branch warehouse and business of Korhumel Steel & Aluminum Co. Purdy will service flat-rolled steel requirements for the New England area, using equipment and personnel of the Korhumel organization in Bridgeport.

Wheeling Opens Branch

Wheeling Corrugating Co.'s $500,000 warehouse and office building at 340-400 27th Ave. N.E., Minneapolis, Minn., has been officially opened. Facilities include a shop for the manufacture of a full line of corrugated metal culvert pipe. The company is a sales subsidiary of Wheeling Steel Corp., Wheeling, W. Va. Neil H. Cheek is manager of the branch.

Link-Belt Plans Expansion

A $3.5-million expansion program has been announced by Link-Belt Co., Chicago. Project: New foundry and manufacturing facilities at its Ewart plant in Indianapolis. After completion of the foundry in about a year, the present foundry will be razed and replaced with the new manufacturing facilities which are scheduled to be completed about midsummer, 1958. The plant produces power transmission chain and sprockets and material handling equipment.

Western GM Plant Bids Expected

Bids will be sent out soon for the construction of General Motors Corp.'s Buick - Oldsmobile-Pontiac assembly plant in Sunnyvale, Calif. Unofficial estimates place the cost at about $50 million.

Makes Solder on West Coast

Federated Metals Division of American Smelting & Refining Co., New York, established a core solder manufacturing facility at its San Francisco plant. All of Federated's plain and activated rosin core solders and acid core solders will be made on the West Coast.

General Controls Builds Plant

General Controls Co., Glendale, Calif., manufacturer of automatic controls, is constructing a plant near San Francisco. The new facility is expected to increase the company's production in northern California by 120 per cent.

Gasmaco Converts Furnace

Gas Machinery Co., Cleveland, will convert a large roller-hearth furnace to Gasmaco Hi-Temperature refractory rollers at the Eastern Stainless Steel Corp., Baltimore. The revision will permit Eastern to continuously anneal stainless steel plates at elevated temperatures, an operation not possible with standard roller design.

ASSOCIATIONS

R. L. Weir, vice president, General Detroit Corp., Detroit, was elected president of the **Fire Equipment Manufacturers' Association,** Pittsburgh. Other officers are: First vice president, W. E. Morgan Jr., Walter Kidde & Co. Inc., Belleville, N. J.; second vice president, A. D. Symonds, W. D. Allen Mfg. Co., Chicago; treasurer, Paul Nurkiewicz, Stop-Fire Inc., Brooklyn, N. Y.

Henry F. Dever was re-elected president of the **Scientific Apparatus Makers Association,** Chicago. He is president of the Brown Instrument Division, Minneapolis-Honeywell Regulator Co., Philadelphia. R. E. Welch, W. M. Welch Mfg. Co., Chicago, remains as SAMA's president pro tempore. T. M. Mints, E. H. Sargent & Co., Chicago, continues as treasurer.

REPRESENTATIVES

Cambridge Wire Cloth Co., Cambridge, Md., appointed Smith-Monroe Co., South Bend, Ind.; Harry I. Sanctuary Co., Poughkeepsie, N. Y.; Hamerslag Equipment Co., South San Francisco, Calif., Materials Handling Equipment Co. Inc., Indianapolis, as distributors for its gripper woven wire slings.

Ekstrom, Carlson & Co., Rockford, Ill., appointed Neff Kohlbush & Bissell, Chicago, distributors of its vertical milling machines for ferrous metals.

Clark Controller Co., Cleveland, appointed Platt Electric Supply Inc., Portland, Oreg., a distributor of its motor control equipment.

Ampco Metal Inc., Milwaukee, appointed as licensee foundries and agents: Slack-Horner Brass Mfg. Co., Longmont, Colo., and Nonferrous Foundries Inc., Indianapolis. R. B. Carolin Foundry & Machine Co., Detroit, was appointed a stocking distributor of standard Ampco raw materials.

Once again ... the

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NEW AND REVOLUTIONARY

SEE it on the stage at the FOUNDRY SHOW

WHEELABRATOR®

SUPER TUMBLAST

provides

SUPER SAVINGS in cost of operation

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World's Largest Builders of Airless Blast Equipment

Ingenious Tooling– versatile H-P-M

Convair Adapts Standard H-P-M 1000 Ton For Stretch Forming

Here's proof of the unlimited versatility of H-P-M hydraulics. In this unusual application, Convair Division of General Dynamics Corp. of San Diego, use an H-P-M all-hydraulic 1000 ton double action press for stretch forming aluminum Convair-Liner dorsal fins. The accurately controlled hydraulic pressure of the H-P-M press throughout drawing and clamping action assures proper metal forming over a plastic die. Equipped with the time-proved H-P-M FASTRAVERSE Closed Circuit hydraulic system, dependable H-P-Ms offer the solution for most tough metalworking problems. Nearly 80 years of experience stand behind thousands of these H-P-M presses now in production all over the world. Call in a nearby H-P-M engineer at the planning stage. He may be able to save you real money.

H-P-M all-hydraulic 1000-ton FASTRAVERSE sheet metal drawing press equipped with a 400-ton blankholder and 250-ton die cushion.

METAL WORKING DIVISION
THE HYDRAULIC PRESS MFG. CO.
Mount Gilead, Ohio, U.S.A.

HPM

Technical Outlook

SOUND WAVE CLEANING— The AEC has ordered an ultrasonic cleaning and degreasing system that uses 20 kilowatts of high frequency power — one of the largest units ever built. The contract goes to Acoustica Associates Inc., Glenwood Landing, N. Y. The firm reports that practically every major metalworking and electronics plant in the country is using ultrasonic equipment in one form or another.

BIGGER LOAD— Before you plan that new warehouse, take another look at your present structure. "Many firms fail to use the maximum load-carrying capacity of their floors," says R. W. Sauer, Armour Research Foundation, Chicago. His studies show that buildings have more strength than designers give them credit for.

MIST IS FINE— Above 200 fpm, the role of a cutting fluid is to cool. According to Professors Shaw and Smith of MIT, a fine "mist" of water does this better than anything available, partly because the water evaporates.

FACE UP— Don't throw away that old part: you may be able to hard face it. One steel company reports it saves $10,000 a year on rolling mill guides alone. Carbon scrapers in coke ovens last 25 times longer when hard faced; hammer mills get from seven to ten times more mileage. Like soles on shoes, the parts can be hard surfaced over and over.

DIAMONDS IN THE SLUDGE— A suggestion of the leadmen in the perishable tool maintenance department at Douglas Aircraft Co., Torrance, Calif., is reaping a $1200-a-month dividend. Small, shallow pans are placed under 14 diamond grinding wheels. A mist coolant directs chips to the pans where they build up into a sludge. After straining and drying, the residue is shipped to makers of diamond wheels. Douglas recovered 738 carats of industrial diamonds the first month.

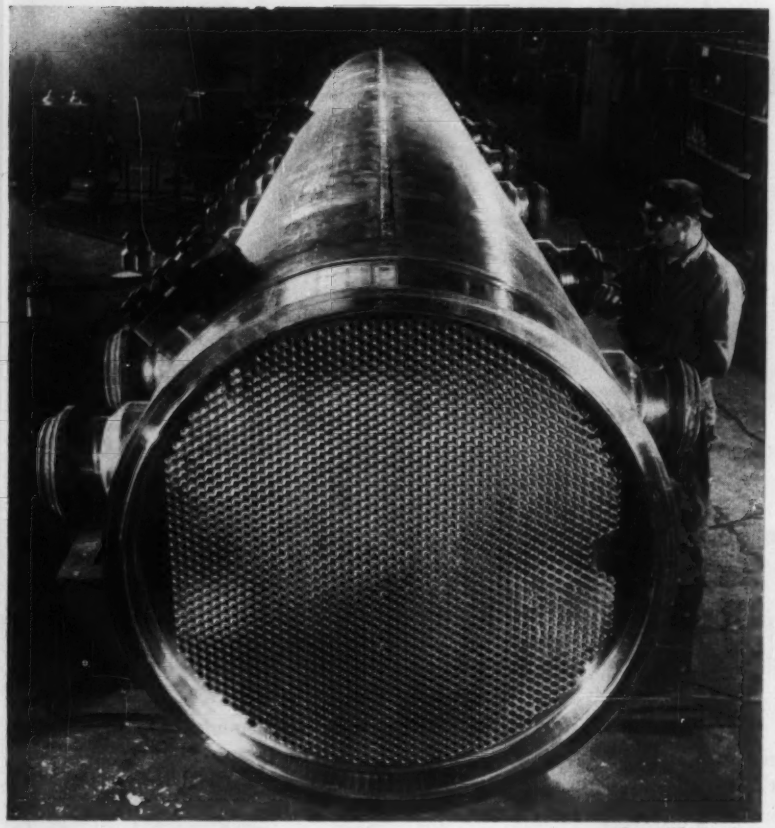
ALCAN INSULATES— Anodized aluminum wire doesn't need to be insulated. Used in electric equipment, it operates at higher temperatures, takes up less space. Developed by the Aluminum Co. of Canada, the wire is anodized with alternating current in a chemical solution. Alcan claims the oxide coating is ductile, too.

RHENIUM FORECAST— Commercial production of the rare earth rhenium this year is stimulating interest in its application, reports Battelle Memorial Institute. Look for it in: Contact points, especially around salt water; in thermocouples, combined with tungsten or molybdenum (it has high thermal electromotive force, stability in reducing atmospheres); in light bulb filaments; pen points; phonograph needles; pivot bearings.

BELT STANDS HEAT— A new kind of rubber conveyor belt for handling hot materials has been developed by B. F. Goodrich Co., Akron. Made with glass fabric insulation, it will handle metal heated to 1400°F.

LARGE SHELLS— Steel castings weighing 720 lb are being made in 3-ft square shell molds at U.S. Steel's National Tube Division, Ellwood City, Pa. The shell molding equipment (built by Shalco Engineering Corp.) produces 70 shells or 35 complete 36 x 36-in. molds an hour. The castings are steel piercing dies for pipemakers.

Metalworking Outlook—p. 53 *Market Outlook—p. 135*



Foster Wheeler Corp

Atomic power plant heat exchanger, symbol of . . .

New Vistas for Stainless

LAST YEAR was the biggest in the history of stainless steel. In spite of automobile cutbacks, 1956 will be even bigger, producers say. And nickel is as tight as ever.

Result: The tantalizing dribble of nickel from government holdings makes popular grades like 18-8 hard to get but keeps users hanging on. More buyers are shopping at warehouses. There's renewed interest in straight chromium grades like 430, and, at last, official sanction for the nickel-saving grades 201 and 202 has come from the American Iron & Steel Institute.

200 Series — Within the last month, the Committee of Stainless Steel Producers of the AISI, and firms like Allegheny Ludlum and Republic, have published descriptions of the mechanical and physical properties of 201 (17 Cr, 4 Ni, 6 Mn) and 202 (18 Cr, 5 Ni, 8 Mn). They agree that these materials are *not emergency substitutes* for 301 and 302. They are a new family. They can be used interchangeably with 301 and 302 in most instances, with no change in techniques of manufacture.

There are some obvious differences. In the annealed condition, they are somewhat harder and have higher yield strengths than 301 and 302, but their ductility is comparable to conventional chromium-nickel steels. They scale more rapidly than 300 steels at annealing temperatures used for that series—so 50 to 100°F lower annealing temperatures are recommended.

Typical treatment: 60 minutes per inch of thickness at 1850 to 1950°F for cold-worked material. With this anneal, 200 and 300 steels can be given the same pickling treatment.

Tryout—A considerable quantity of 201 and 202 has been placed on field test, and the results are beginning to come in. To get an impartial appraisal, STEEL went to users and producers for their reactions.

Biggest user so far is the Budd Co. One official said: "These steels aren't new. They came in during the war. We used 2-million lb perhaps ten years ago. We are using 201 in increasing quantities and expect to use more. How much more? Perhaps (it's a guess) 6-million lb of 201 in 1956. It will go into trailers and rail cars."

No Nickel—Budd's goal, W. A. Ehresman, director of purchases, pointed out, has been to help producers stretch nickel in the hope of achieving a no-nickel goal. Type 201, in effect, gives twice as much metal for your nickel as 301.

As is to be expected with a new material, there are mill problems with 201 and 202, but nothing that can't be corrected when mills begin producing in quantity. They don't expect the rolling headaches that accompanied TRC, the wartime nickel saver.

Cheaper — There's a 2-cent-a-pound incentive on 201 and 202, although at present it costs Republic more to produce than 300 steels. The cost picture, and variations in heats reported by some early users, should straighten out with quantity production.

In spite of the cost incentive, getting 300 users to switch to 200 will be a tough battle. U. S. Steel reports "hesitance on the part of the fabricator to change over to the new family for fear that his product will be considered inferior." A case in point is GE's Kitchen Center, a modular unit containing washer-dryer, sink, disposal, cupboards and stove under one stainless top. A big portion of the sales pitch is built around the fact that this top is "18 and 8."

More Comments — William Pierce, vice president in charge of sales, Allegheny Ludlum, says:

"While people can still get nickel-chrome stainless, and they can still get it a little here and a little there, they won't change. Purpose of the 200 series is protection for the customer and for ourselves. It doubles the amount of metal we can produce."

Comments A. G. Neese, manager of stainless and alloy sales, Sharon Steel Corp.: "We believe the false publicity given to the availability of nickel has deterred manufacturers from changing grades since they feel some rays of hope on nickel."

Inertia—When and if users can be persuaded to shift to 200 steels, how many of 300's varied jobs can they take over? Estimates run from 35 to 75 per cent. Even 75 per cent may be conservative. Some feel the corrosion resistance of 201 and 202 may not match that of their 300 counterparts, but there is evidence to the contrary. No significant differences have been found in 24 years of testing by Electro Metallurgical Co. and in 14 years of testing by the International Nickel Co. Specimens were exposed to industrial and marine atmospheres.

You can see how some of the pioneer users of 201 and 202 feel about them in the box on page 95.

400 Series — There's another sure way to have plenty of stainless: Use the straight-chrome 400 steels. Unfortunately, users run into trouble when they try to make them do jobs they aren't cut out for—deep drawing, for instance.

In automotive trim and other decorative applications where it can be cleaned, 430 will keep its hold (last year 30 per cent of the stainless market). Washington Steel Corp. made news Mar. 20 by reducing the price of 430 stainless sheets $45 a ton. The move makes 430 about 10 cents a pound cheaper than 302 sheets. With the auto cutback expected this year, such price bait may be needed to keep 430 growing, especially if there is any trend toward cutting down brightwork, a la Continental.

Cutlery — The cutlery grades (410, 420, 440) have a bright future. Even in the best sterling flatware, it's almost impossible to buy knives without stainless blades.

Edward G. Budd Jr. President of Budd Co. Talks About Stainless:

"We know how important nickel is: We've had our business interrupted by it in two wars. And the truth is that nickel is a strategic material, even in peacetime.

"Our effort all along has been to find structural stainless steel with less nickel. For our purpose, 201 is completely interchangeable with 301.

"The first stainless structure we built was an airplane in 1931. Our first train was delivered in 1934 and our first stainless trailer in 1937. Now we are taking another look at aircraft. The heat resisting, high strength qualities of stainless begin to appear attractive for airframes. We have set up a special engineering department to correlate our great mass of experience with stainless as a structural material, to investigate other materials and to assess their value in the aircraft field."

U. S. Steel says the picture for the 400 series continues to be good, especially in automotive, jet engine, other aircraft applications and liquid fertilizer manufacturing, storage and applying equipment. Sharon Steel thinks the largest deterrents to its growth come from aluminum, plastic and plastic-coated steel competition.

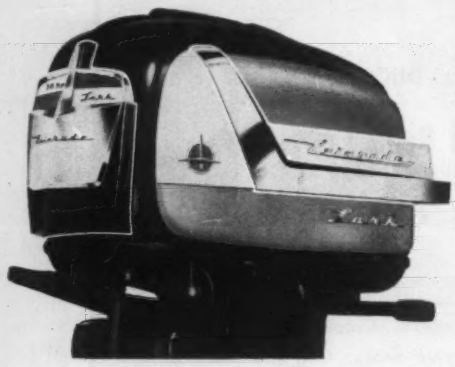
Aluminum makes brisk competition for 18-8 also, but in at least two instances, automobile wheel covers and ground level building trim in coastal cities, 18-8 is moving back fast.

Buildings — The architectural picture for 202 and 302 was never brighter. A big building with a stainless exterior means 400 to 500 tons of stainless at one clip, but the less impressive applications—store fronts, doors, elevators, escalators—build the volume. Use of stainless in bridges has barely made a start, but deserves to flourish.

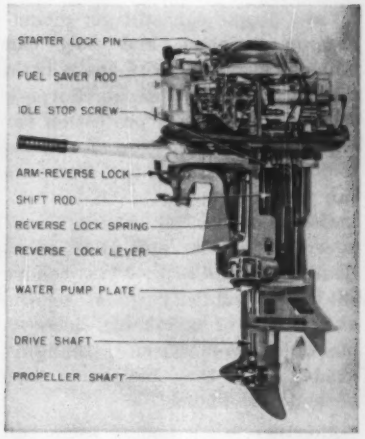
The curtain wall has price problems: Stainless panels have to be made of a gage one-third as thick as aluminum to compete pricewise. Stainless roll-formed shapes have to compete with aluminum extrusions. But downspouting, flashing and other roof drainage products of 301 are having a field day with a 40-per-cent price advantage over copper. Installed cost is about three times that for galvanized material, but there's no maintenance, and roof life can be guaranteed indefinitely. For ventilators and roofs in corrosive atmospheres, the noncorrosive features of 201 are making sales.

Little Things—Hardware, doors and windows, switch plates and railings are catching on in stainless. It can compete pricewise with bronze. Plumbing is a promising field. Vending machines, especially those for beverages, are a growing market. Wherever food is handled, 18-8, the dairymen's

Stainless: Style and Structure



Outside the Evinrude Lark, stainless panels painted red, white, gold and charcoal with clear metal accents. Inside, stainless parts for strength and corrosion resistance



darling, has moved in.

That creates problems for 201 and 202. For sanitary purposes, they are every bit as good as 301 and 302, say producers, but the dairy industry won't forget 20 years of satisfaction with 18-8, even if nickel gets tighter. Dairy associations specify 18-8, and in some cases specifications (by metal composition instead of performance) are written into state laws.

Kitchens—Restaurant and hospital equipment are well established fields for 18-8 where chrome - nickel - manganese will move in slowly. Lo Temp Mfg. Co., Jonesboro, Ga., is using 202 for work tables and countertops. The company says it works easily and polishes about the same as 302.

The school and church building boom is good news—almost all have kitchens. Restaurant business for stainless is much larger than published figures indicate because much of this metal comes from warehouses.

Cookware — Besides sinks and counters, every kitchen has cooking utensils, about the hottest thing in stainless. Bloomingdale's, a big New York store, reports that 64 per cent of its cookware sales are stainless. A good portion of the pots are stainless clad carbon steel or copper, or stainless which is copper plated for good heat distribution. The covers are solid.

Heavy gage stainless clad for tanks and process equipment is growing fast. Stainless clad on one side turned up on a 138-ft standpipe at the General Motors Technical Center. "No maintenance," says GM, but no one denies the decorative and advertising values of the gleaming landmark.

Appliances—Some of the new washers are getting stainless tubs. They don't get that scummy look. Wall ovens are showing up with stainless fronts. Home and commercial dishwashers have proved a boon—strong cleaners used in them turn aluminum white.

But the appliance field generally is fickle, up one year and down the next as the style winds blow. Right now colors are the rage, and coloring stainless is gilding the lily. (But Evinrude has done it on an outboard motor, with blackened and color inlaid stainless used for trim.)

Aside from outboard motor parts and miscellaneous yacht fittings, stainless made little headway in the marine field until recently. Not many will remember the top-heavy World War II destroyers built with thin-walled stainless deckhouses to keep them upright. The big naval field is in atomic power. Land-based atomic power plants have huge potential, too. Stainless tubing (for heat exchangers), stainless castings and heavy plate structures will benefit especially.

No Corrosion—Boom times are ahead for stainless in chemicals, pulp and paper, photography, pharmaceuticals. Any industry that requires metal with corrosion resistance and strength at high heat is a market.

But the market where everyone looks with greatest anticipation is transportation. Will the stainless top on the Cadillac El Dorado brougham catch on? Will the scooped out fenders with the stainless steel lining on the experimental Oldsmobile Delta turn up on a 1957 production car? Will the stainless steel grille have staying power in competition with anodized aluminum? It's the year of the big change, and fads play a big role in autos.

Pay Load—In trains, truck trailers and busses, stainless is an old and glowing story. The Burlington Zephyr still is running, bright as the day it was built after 21 years and 2.8 million miles of service. Strength through stainless made it possible to design 35 per cent more capacity into the Fruehauf Trailer Co.'s Volume Van without increasing exterior dimensions. It's now being made of 201. On new Canadian Pacific trains with stainless exteriors (built by Budd), yearly paint savings alone are estimated at $70,000.

Wide Blue—You have to look up, and up, for the stainless frontiers. The stainless aircraft era was tentatively launched by Budd in 1931, but the metal didn't get too far in the sky until recently. Now you'll find it in ram-jet engine structural and burner components, pneumatic system ducts, hydraulic tubing, engine nacelle parts, components to reduce galvanic action

between steel and aluminum structures, exhaust systems, engine rings, acid tanks for missile fuels, firewalls and afterburners.

Its biggest air-borne use may lie in skins. Experimental planes like the Bell X-2, designed to penetrate the heat barrier, must pay a weight penalty for high temperature strength. A large portion of the X-2 skin is stainless. Missiles, reentering the lower atmosphere, will also need stainless skins to hold them together as they heat up from friction with the air.

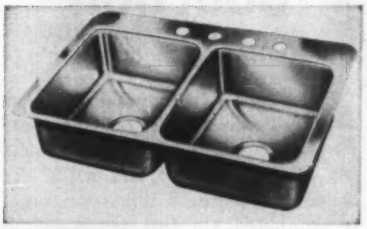
What's New—In aircraft, the precipitation hardening stainless steels have made great strides. Armco Steel Corp.'s 17-7 PH and 17-4 PH are widely used. Armco expects further improvements for these steels, among them new treatments that will increase guarantees for 17-7 PH to 200,000-psi minimum tensile and 180,000-psi minimum yield strength.

U. S. Steel has had a precipitation hardening candidate, Stainless W, since the war, and Allegheny Ludlum has just announced AM-350 to bridge the gap between the 300 and 400 series. It may be hardened either by subzero cooling or double aging, and has the nominal composition: C 0.08, Mn 0.60, Si 0.40, Cr 17.0, Ni 4.2, Mo 2.75.

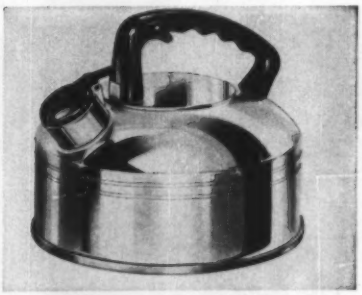
• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

What Users Say About 202

Trial results are beginning to come in. The verdict: Mostly favorable.



Sink Division, Carrollton Mfg. Co., Carrollton, O. "Type 202 material is quite similar to type 302 (18-8) in drawing, finishing and welding. No cracking or noticeable susceptibility to any cracking occurred after 2 hours of lithium chloride stress-corrosion tests."

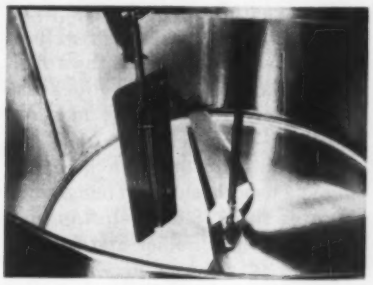


West Bend Aluminum Co., West Bend, Wis. "Prior to changing (from copper) to type 202, production included two spinning operations to smooth out wrinkles. Indications are that these spinning operations can be eliminated with 202. The color of type 202 is closer to chromium plate than the 300 series stainless steels."

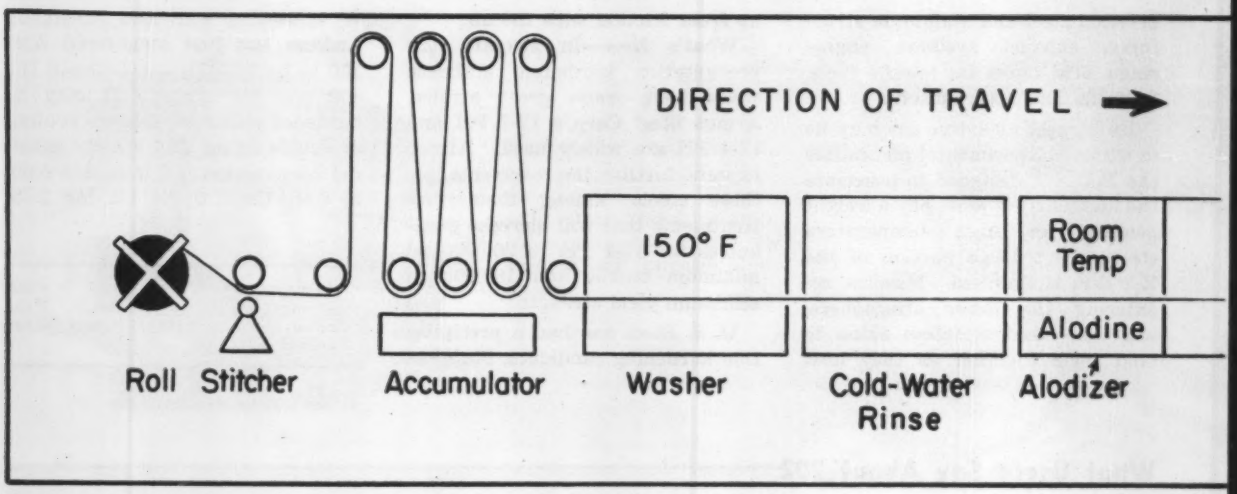
Bloomfield Industries Inc., Chicago. "The use of type 202 in malt cups drawn from 0.025-in. stock has not required any additional annealing. Throughout all operations, including drawing, curling, polishing and spot welding, there were no noticeable differences between type 202 and type 302."

Bradley Washfountain Co., Milwaukee, Wis. "We ordered 202 stainless to be used in forming the bowls of Duo washfountains in the belief that this stock would draw better than 302. We hoped that an annealing operation necessary with the latter could be eliminated. Preliminary work with 202, however, has been disappointing, since so far it does not draw quite so well as 302."

Inland Steel Co., Chicago. "We are considering the use of type 202 stainless steel for the mullions, column covers and exterior panels of the new Inland Steel building in Chicago."



Cherry-Burrell Corp., Chicago. "The large round processor (of type 202) has been in service since Sept., 1955, and is giving service performance equivalent to type 302. Since dairy and food processing equipment must last for years, it is too early to come to any definite conclusions about its acceptability."



Continuous strip coating line at Youngstown Industries Inc.

Rolled-On Colors Tone Up Production

THE CONTINUOUS strip coating line at Youngstown Industries Inc. represents a revolutionary change in manufacturing methods for the Girard, O., producer of metal awnings and aluminum siding.

The company used to spray paint awnings (siding manufacture has started since installation of the coating line), but film thickness wasn't always uniform, flow-out marks were left and paint was lost by overspray.

Now, the paint is applied by what Gasway Corp., Chicago, calls its reverse coating method. The paint is flowed on the strip. This eliminates flow-out marks in the finish and variations in film thickness due to normal variations in strip.

Output—Between 1200 and 1400 lb of aluminum strip an hour are coated on both sides. Youngstown operates three, 8-hour shifts a day in the spring, summer and fall. Its schedule is reduced in winter.

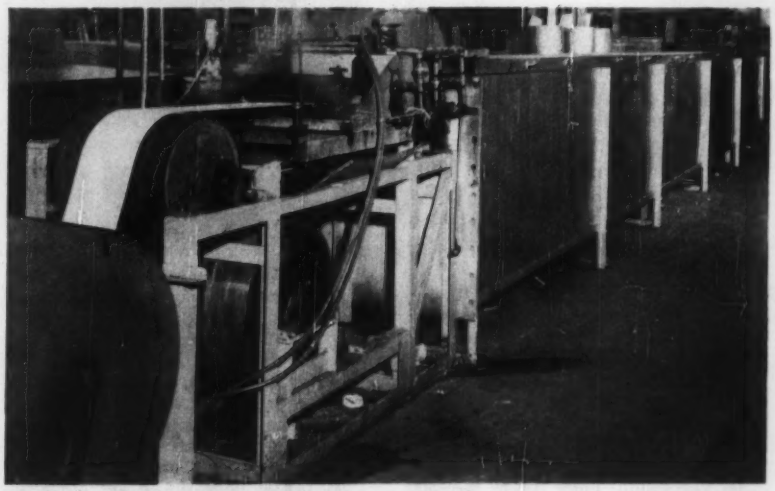
Three operators per shift handle the strip line. Stock is 0.025 and 0.040-in. thick aluminum and some steel. It varies in width from 3 to 14 in. Most coating is done on 10 and 14-in. stock, which is slit at the end of the line into 5 and 7-in. widths.

Paint—The line normally runs at 55 fpm. Stock for awnings is coated on both sides; siding stock (10 11/16-in. wide) is coated full film thickness on one side and skim-coated on the other.

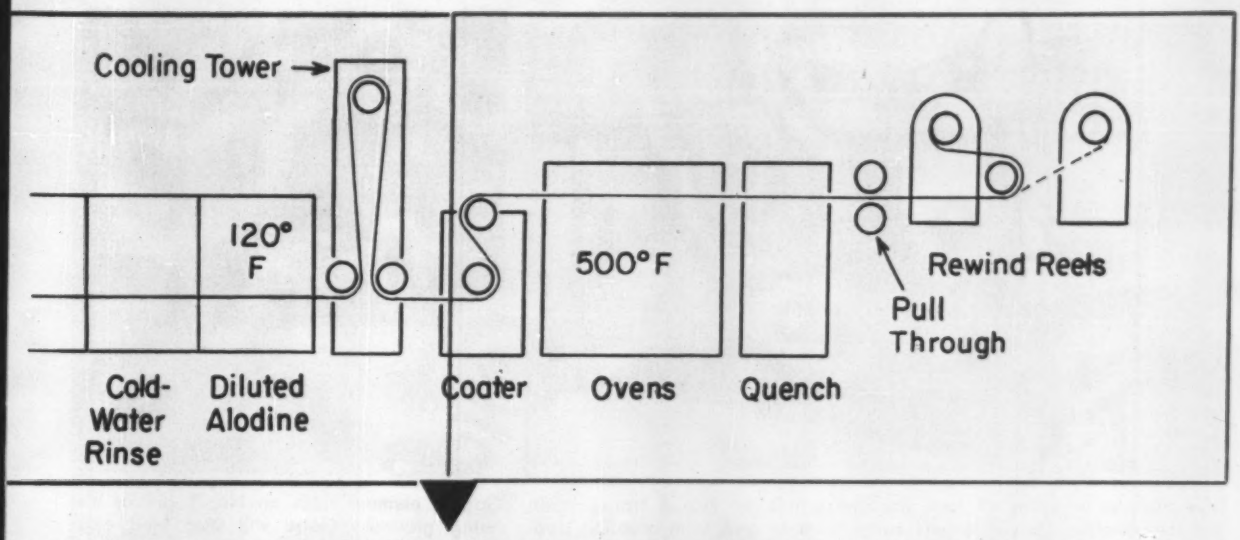
Paint consumption stands at about 5 gallons per 1000 lb of 0.025-in. aluminum, a saving of 50 per cent over the spray method. Paint solids run 50 per cent for awnings and 60 per cent for siding. Film thickness (after baking) is a uniform 1 mil.

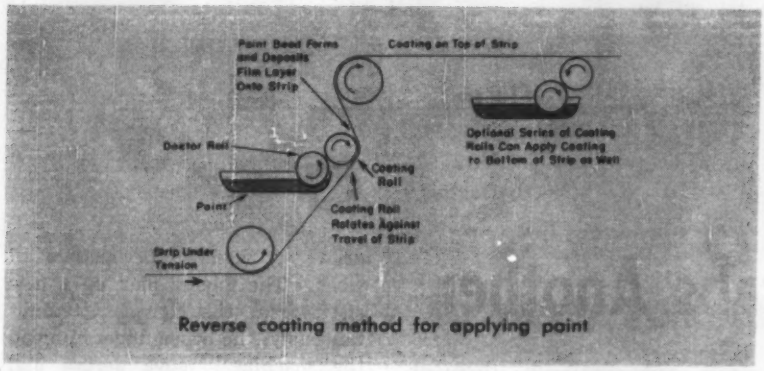
Procedure—Two unwind reels are at the head of the coating line. They are mounted together, so one can be loaded with coil while the other is feeding. When one coil is exhausted, the full reel is swung into the feeding position and the tail end of the other reel is stitched to the beginning of the new coil.

An accumulator is built into the line to maintain the continuous run. It consists of four rolls mounted 15 ft above the floor and



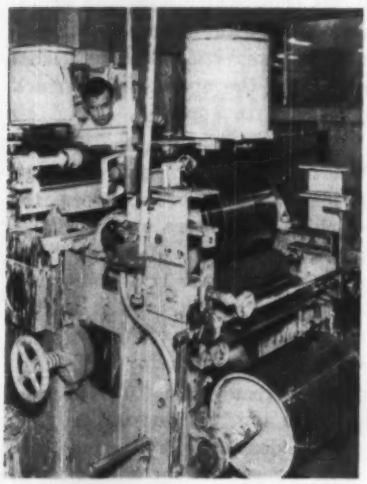
Enameled strip comes from the oven




Paint Bead Forms and Deposits Film Layer Onto Strip
Coating on Top of Strip
Optional Series of Coating Rolls Can Apply Coating to Bottom of Strip as Well
Doctor Roll
Coating Roll
Paint
Coating Roll Rotates Against Travel of Strip
Strip Under Tension
Reverse coating method for applying paint

three rolls at floor level on a special elevator. The strip is laced between the reels to provide about 90 ft of reserve strip.

When splicing must be done, the strip is braked at the feed-in end of the accumulator. The reserve strip continues through the line, paying out as the bottom rolls of the accumulator rise. When splicing is complete, the brake is released, and the reserve builds up again as the lower accumulator rolls descend.


Rollercoater covers both sides of strip

Coating Preparation—The strip goes into a power washer at 150°F, followed by a cold water rinse. It then is Alodized (an American Chemical Paint Co. process) at room temperature, rinsed cold again, then treated with a diluted Alodine solution. The next stage is a tower in which the strip is cooled and dried before it enters the coater.

The rollercoating machine is set up to coat both sides of the strip, and can apply a different color to either. At Youngstown, the coater is protected from plant traffic by an enclosure.

Baking—From the coater, the strip (allowed a flow-out time of 5 seconds) is carried under tension and passes into the oven. It is baked at a controlled temperature curve from room temperature to 500°F. Baking time for awning strip is about 1½-minutes, for siding, 1 minute.

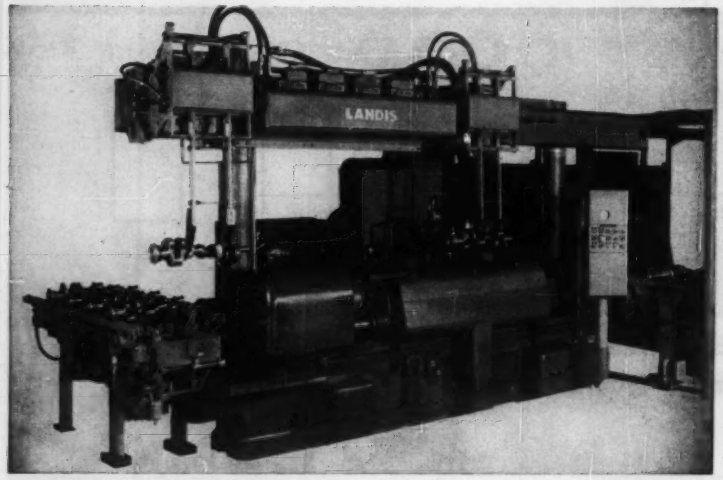
From the oven the strip goes through a quench, a pull-through unit, a slitting device and then is recoiled on one of two power-driven reels. When one reel is filled, the strip is cut and started on the other reel.

A day or more is allowed for curing the baked enamel before it is roll formed into awning or siding lengths and further processed into the finished product.

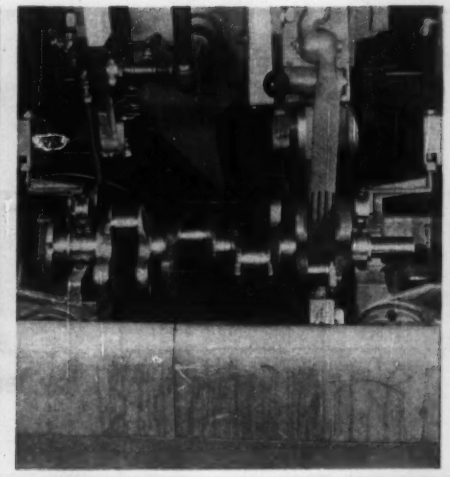
Forming Lubricant — The roll-forming operation is smoother because of the lubricating qualities in the baked enamel finish. This lubricating feature is so desirable in roll-forming that the company applies a skim coat of enamel to the underside of the siding, which serves the double purpose of producing a better roll-formed panel and protecting the back of the panel corrosion.

Youngstown makes a line of awnings that includes 18 standard colors, including five pastels, and a line of siding in four colors. The firm plans to adapt its line to handle color changes without shutting down.

This will mean installing extra paint rollers on the coater. At any time, operators will be able to remove rollers, clean and recharge them with a new paint color.

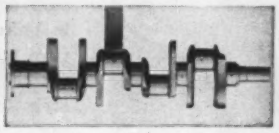


First machine in a line of four, this one grinds the No. 4 crankpins on V-8 crankshafts. Loader fingers carry parts to and from grinding position. Conveyor at right goes to machine No. 2



Gaging element rides on No. 1 pin as it's being ground. Gage will stop feed and spark-out when part is to size

No. 4 Crankpin



No. 3 Crankpin

No. 1 Crankpin

No. 2 Crankpin

Automation Grabs Another

Crankshafts for a V-8 engine move automatically through four grinders to get their pin bearings dressed to size. Gages control machine cycles, also regulate the transfers

ANOTHER manual operation is biting the dust.

Crankshaft pin bearings are being ground automatically. There is no hand loading. Cycles are not interrupted to index the shaft for each pin.

A Family — Four standard crankpin grinding machines, built by Landis Tool Co., Waynesboro, Pa., are synchronized electrically, hydraulically and mechanically. Landis-designed loaders link the machines into a continuous line, move the shafts from one machine to the next.

Cranks come to the line from the left. They're dropped onto a conveyor. The loader picks up a single crankshaft and moves it transversely into grinding position on the first machine.

The shaft is lowered into two chucks. Loader fingers swing out to clear the shaft as they return to the upper position. A gaging finger moves into position to locate the crankshaft longitudinally in front of the grinding wheel.

Double Duty—The loader, which has a set of fingers at both the right and left-hand ends, returns to its original position. One set of fingers is now over the conveyor and one set over the crankshaft in the machine.

The grinding wheel moves forward into position and grinds both sidewalls and the outside diameter of the first crankpin (the No. 4). Outside diameter of the pin is held to within 0.0005-in.

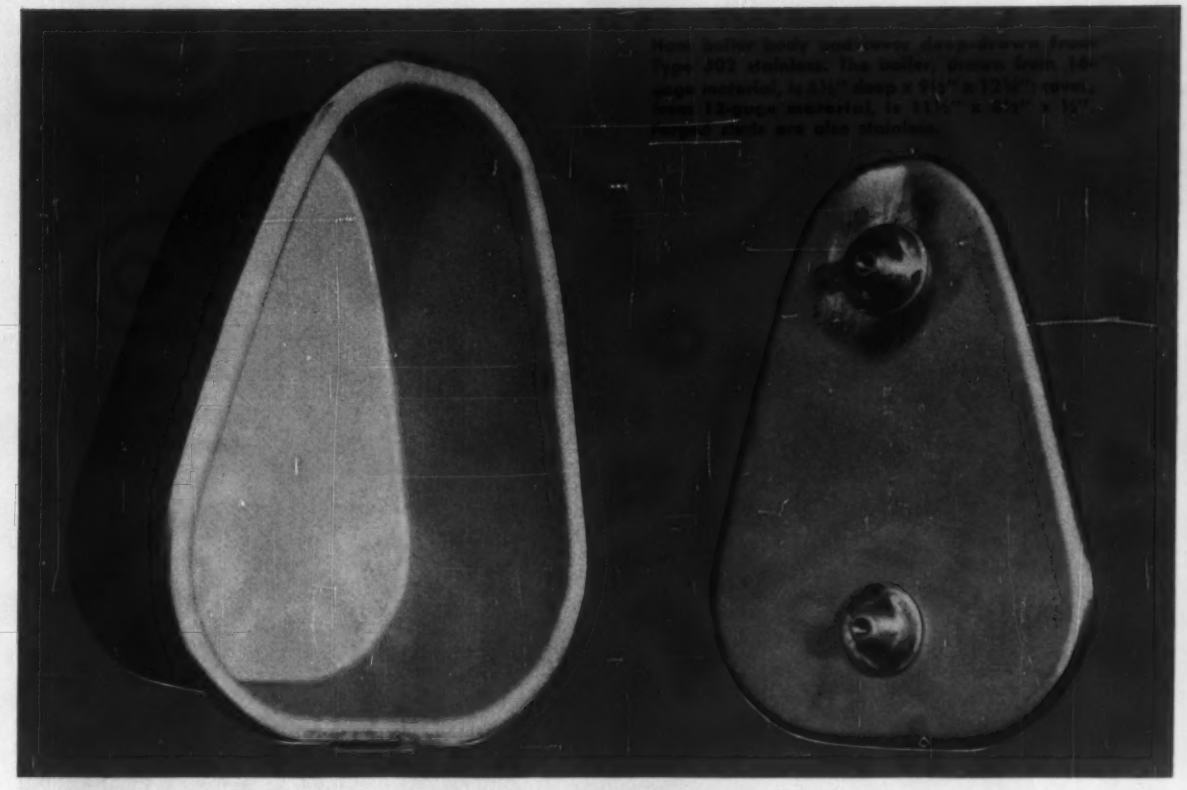
A double contact air gage, automatically positioned on the pin being ground, controls the grinding cycle through feed and spark-out periods to final size.

Shaft Shift—As the wheel withdraws, it signals the loaders to work. The fingers pick up a new shaft from the conveyor (simultaneously, the other fingers unload the machine), move across and put the ground shaft on another conveyor and the rough shaft into the machine.

On the conveyor that will take the shaft from the first machine to the second, a set of air gages checks the ground pin for diameter, width and taper. If a dimension doesn't check out, signal lights show which it is, and grinder No. 1 is automatically stopped until the correction is made. Visual gages tell the operator how much correction to apply.

This cycle continues through the line until all four pins are ground. Conveyors between the machines can store a quantity of parts. Machine loaders won't operate unless there is a crankshaft ready for loading and a vacant space on the next conveyor to receive a finished shaft.

Stock removal is 0.020-in. from each pin and 0.005 to 0.007-in. from each sidewall. Production estimate per set of four machines: 50 complete crankshafts an hour.



Pictured as is... to show you how T&W TECHNIQUE SAVES

Forging, weighing .284 lb., of 302 stainless steel, for stud shown above.

The illustration above shows a stainless steel ham boiler, consisting of two deep-drawn parts, plus two forged studs on the cover, all of which we make and assemble. This picture is unretouched. We left it *as is* because it tells so plainly how our technique produces a smooth, nearly-finished job, minimizing subsequent polishing operations. This saves the customer money.

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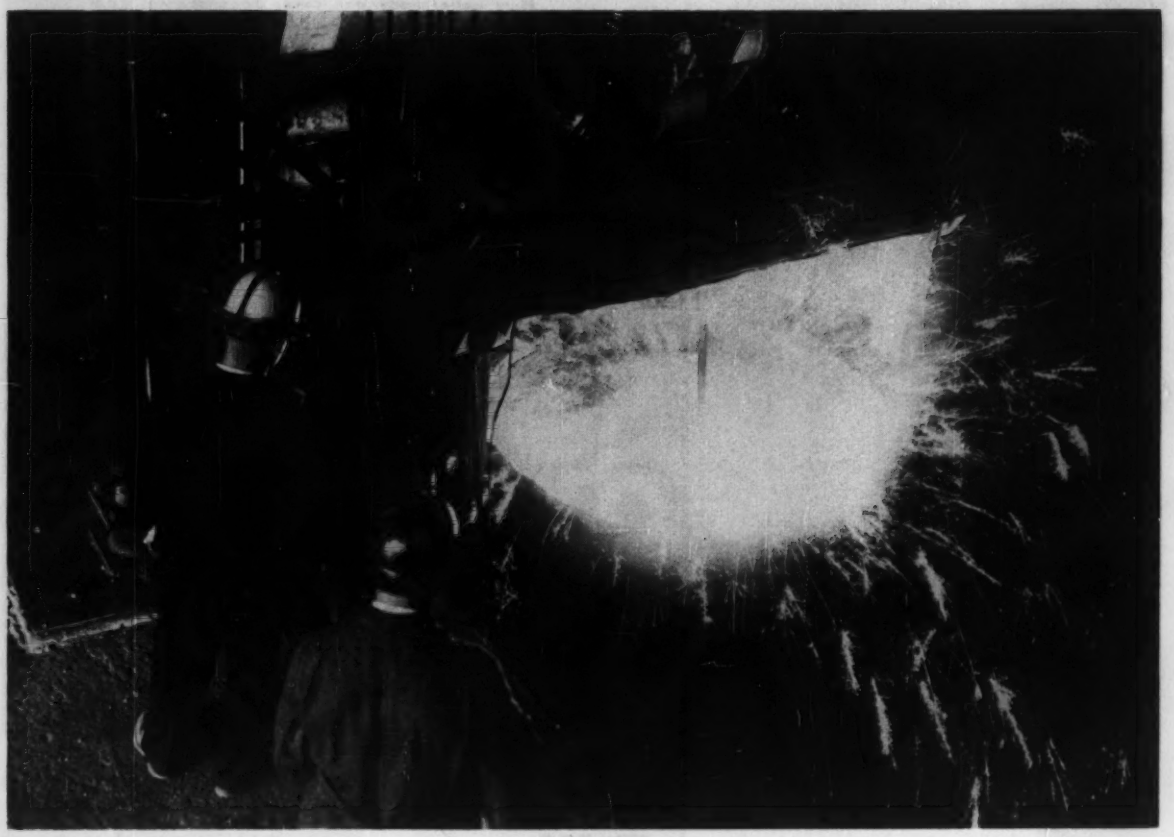


Injection of calcium carbide through a graphite tube into a ladle of iron to reduce its sulphur concentration. The operation is being performed at a plant of U. S. Steel after the metal has been poured from the mixer but before charging into the open-hearth furnace

Sinter and Sulphur

The Cincinnati meeting of the blast furnace and open-hearth committees of the AIME ran heavily to desulphurization and sintering. Here's what some of the speakers said

"BY 1960 Lake Superior ores will satisfy only about one-half of the total requirements of American blast furnaces. High-grade imported ores—mainly from Quebec-Labrador and Venezuela—will approximate 30 per cent, and taconite pellets and Michigan jasper concentrates 13 per cent of the total.

"Finer Mesabi ores will be screened at about ⅜-in. and the fines sintered or otherwise agglomerated. By 1960, possibly one-half the Lake Superior ore supply, or roughly one-fourth of the total supply, will be so beneficiated.

"Because of the reduction in slag volume resulting from these higher-grade raw materials, coke rates will be reduced and furnace output increased."

Authority — The speaker, John Griffin, Pittsburgh coal and coke consultant, was doing some informed crystal gazing at the Blast Furnace, Coke Oven & Raw Materials conference (sponsored by the American Institute of Mining, Metallurgical & Petroleum Engineers, Apr. 9-11). His purpose: To point up some problems that must be solved before maximum benefits can be obtained from new iron-bearing raw materials.

Many other papers showed how alive the industry is to the challenge. The exchange of information on sinter plants at Extaca, Minn., Benson Mines, N. Y., Hamilton, Ont., Weirton, W. Va., and Margram, Wales, was typical. A few points culled from those papers:

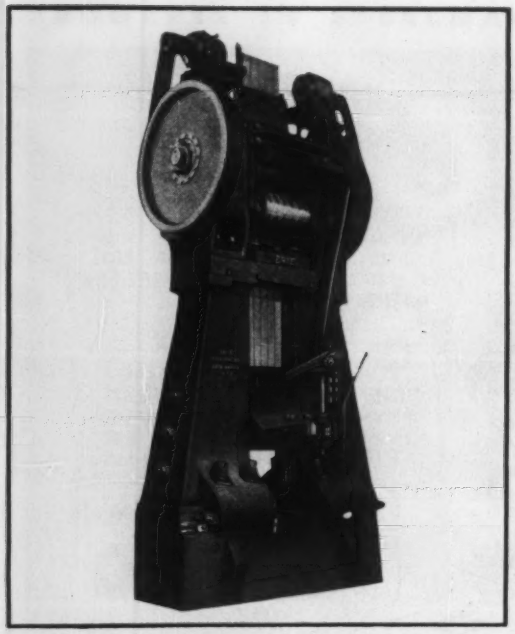
- The Steel Co. of Canada's experience in making and using sinter has shown benefits to be gained by air cooling and screening sinter for open-hearth charging. In previous open-hearth practice, boils and blowouts had occurred from

HM-M-M-M.
HM-M-M-M.
OLD MAN GRIGSBY COMES DOWN TO THE O.H. ONCT A YEAR, BUT HE STILL THINKS HE'S A MELTER WHEN HE GETS HERE.
YEH, AND THE ONLY TIME THE BOSS LOOKS AT A TEST ANYMORE IS WHEN GRIGSBY IS HERE. HE'S NO BETTER AT IT NOW THAN THE OLD MAN.
BOTH OF THEM GUYS IS AFRAID TO CALL IT FIRST AND IF THEY DON'T LET BLACKIE OR MARTY GET A LOOK, THE POOR GUYS'LL GO NUTS!
KLEKES

The big stall

The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

BASIC INCORPORATED 845 HANNA BUILDING • CLEVELAND 15, OHIO



"Gee, Dad--I bet you forged it in one impression on that big 10,000-lb. Board Drop Hammer!"

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Quiz kid? Mmm, not exactly. It's that Erie Foundry book in his back pocket that did the trick.

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Well you see, we've been thinking that it would be kind of nice to have the youngsters (yours and ours) understand this forging business a little. Might make them think Pop's *almost* the man Superman* is.

So we poor, unsung fathers at Erie had the exciting story of "Forgeland, U.S.A." put in a book—in the kind of language youngsters understand—with pictures too!

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"OUR 61st YEAR"

FORGING HAMMERS • TRIMMING PRESSES • HYDRAULIC PRESSES AND ALLIED EQUIPMENT

Iron Ore Sources: 1960

	Gross Tons	Per Cent
Lake Superior ores	63,000,000	45.3
Taconite and Michigan concentrates	17,750,000	12.8
Northeast, southern and western U. S. ores	17,000,000	12.2
Canadian imports	20,300,000	14.6
Other imports	21,000,000	15.1
Total	**139,050,000**	**100.0**

Source: John Griffin

using water-cooled sinter. Air cooling eliminated these hazards and the dust-free screened sinter lessened the amount of plugging and maintenance of checkers.

• In blast furnace operation there is a limit to the proportion of carbon or CO that can be oxidized to CO_2 in the presence of metallic iron. Equilibrium is established at a temperature of 1255°F with a gas mixture of 40-per-cent CO_2 and 60-per-cent CO. As more knowledge of sintering and sinter use is acquired, these equilibrium gas conditions will be more readily achieved and higher standards of efficiency in furnace performance attained.

• Control of moisture in many sinter plants consists of nothing more than the operator's "grip test." Newer plants make use of weight readings as a basis for moisture additions. Since proper moisture content implies optimum permeability, it follows that automatic moisture control based upon continuous permeability measurements would be advantageous.

• When Weirton Steel Co. put in its sinter plant, it installed a complete gas-washer, water-collection system for the recovery of flue dust from the gas washer and precipitator waste waters. The waste waters are delivered to Dorr thickeners and the thickener sludge dried on Eimco disc filters. Filter cake is discharged onto a shuttle belt conveyor, which can deliver the cake to the sinter-mix conveyor or to railroad cars.

• The two-layer charge system provided for in J&L's Benson Mines sinter strand takes advantage of the fact that water vapor condenses in the lower and cooler layers of the mix, and the oncoming waste heat from above provides part of the necessary heat for fusion. Two separate mixes can be metered, one on top of the other. The bottom layer is run lean in moisture and fuel. Results: Smoother operation, some savings in fuel and a more uniform product from top to bottom of the sinter cake.

• On the 8 ft 3 in. wide sinter strand at Margram Ironworks, Steel Co. of Wales, the pallets run on rubber rails with steel cladding, designed to take 90 per cent of the load, leaving a ⅛-in. gap between the solid side rails and the wearing pad of the pallet. This gap is filled with grease supplied by automatic pumps to provide the air seal of the strand.

• Plugging of the swinging spout by sticky, fine ore, particularly wet taconite concentrate, was one of the most serious obstacles to steady feeding of the Extaca sinter plant at Oliver Iron Mining Division, U. S. Steel. Plugging is minimized by curved stainless steel sides on the spout. Sticky material does not adhere readily to the polished surface or rounded corners.

Desulphurization—The stage for discussions on desulphurization of hot metal was set by John Chipman, head, Department of Metallurgy, Massachusetts Institute of Technology, who outlined the problem and the solutions being attempted. These compounds are being evaluated for their desulphurizing effectiveness:

Calcium carbonate
Burnt lime
Calcium carbide
Calcium cyanamide

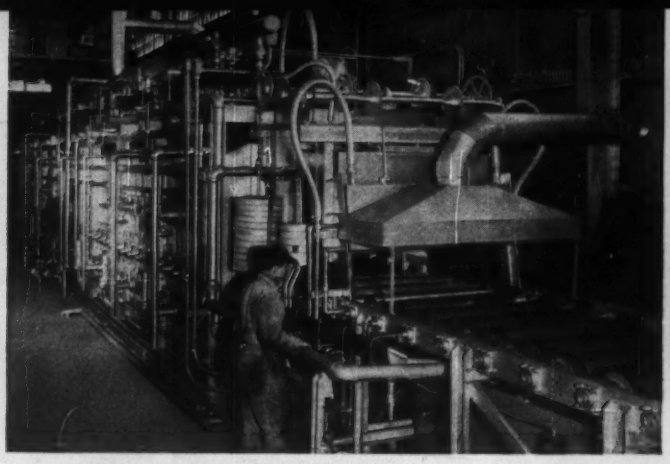
The four desulphurizing agents have in common the quality of being solid dry reagents. They do not give off noxious fumes. The reaction product floats and is easy to rake off the melt. There is no serious danger of reversion of sulphur into the metal. All the reactions are surface reactions with particles; particle size is important.

The problem, said Dr. Chipman, is to find the best way to apply the reagent to the metal, to find the cheapest reagent and to find the easiest way to handle, store and feed it.

Injection Technique — J. N. Hornak, assistant director, Steel Processing, Applied Research Laboratory, and E. J. Whittenberger, chief development metallurgist, South Works, U. S. Steel, described the results of tests with an injection technique for ladle desulphurization (STEEL, Mar. 5, p. 100). They found the technique made it possible to obtain uniform results where additions to the stream or ladle bottom had produced erratic results. The injection technique proved applicable to calcium carbonate, burnt lime, calcium cyanamide and calcium carbide.

Although there is a wide difference in costs of these four reagents, selection should be based on the quantity of material required, from the standpoint of iron-temperature loss and the time required to complete desulphurization. Because 22 per cent of the sulphur in open-hearth steel enters it from the fuel, it might be worthwhile to pay more per gallon for sulphur-free fuel oil (suggested someone from the floor).

continuous processing

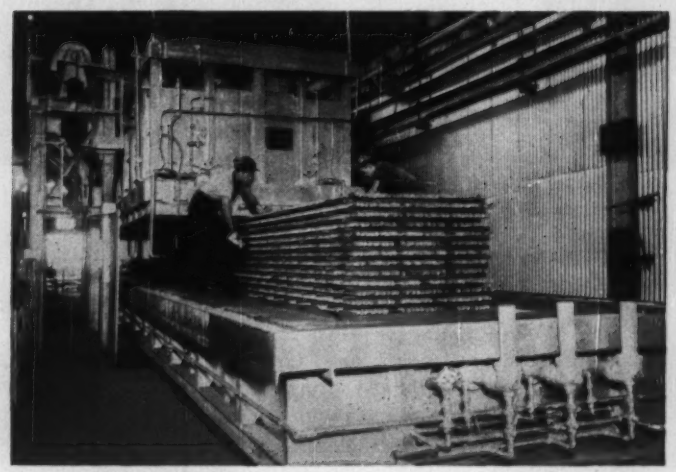


'Surface' roller hearth furnace for continuous carbon restoration-annealing of bars and coils.

'Surface' atmosphere equipment

'Surface' lift cover car bottom furnace used for batch carbon restoration-annealing of bar stock.

batch processing

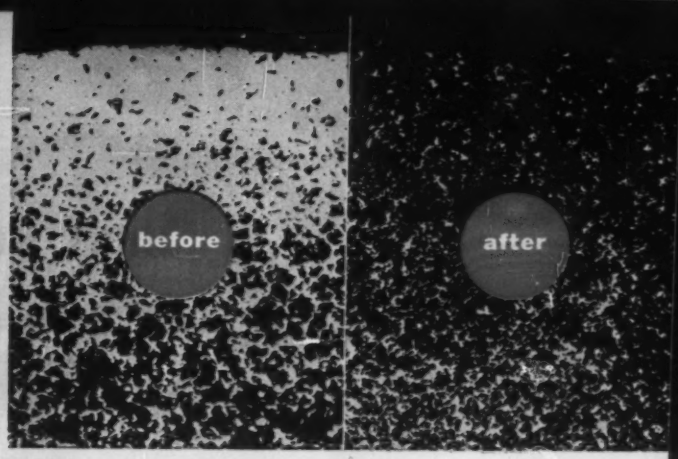


Here are a couple of graphic reminders that Surface Combustion atmosphere equipment helps meet today's demands for top quality steel.

These cases repeat a familiar story in the steel industry: a steel processor wants to improve the metallurgical qualities of his stock—'Surface' equipment meets, and frequently exceeds, his specifications.

In your current program for improving the marketability of your products, look to 'Surface' to provide the right atmosphere for easier sales.

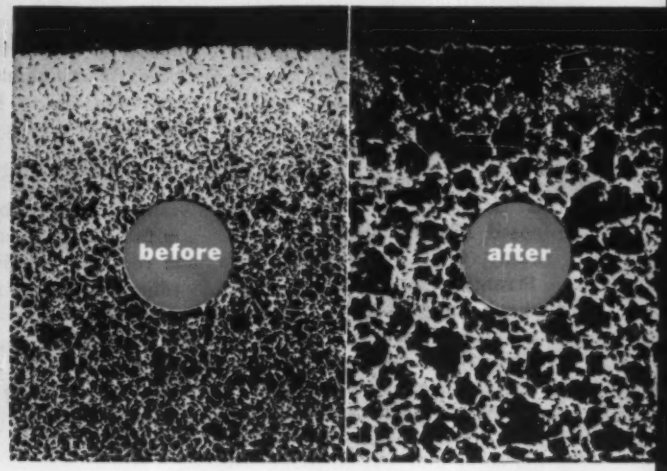
'Surface' atmosphere generators for this installation. RX unit in the foreground, NX unit in the background.



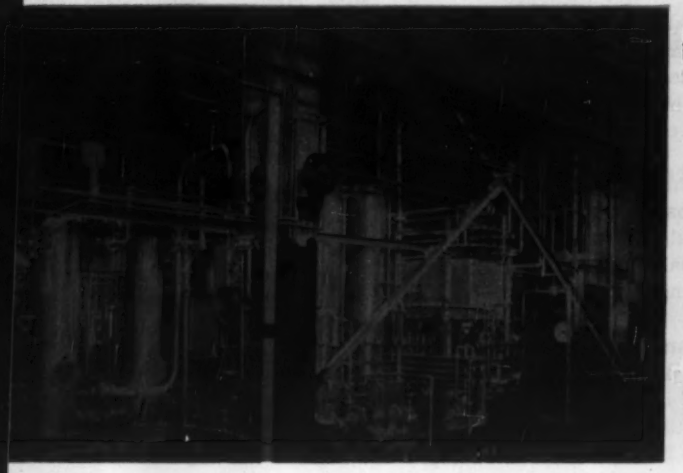
Before and after photomicrographs, Carbon steel AISI C1050. The results: carbon restored to the decarburized skin; steel which reduces the customer's machining costs, eliminates rejects.

makes steel easier to sell

'Surface' atmosphere generators next to the furnace. NX generators and coolers in the foreground, RX generator and dew point recorder in the background.



Before and after photomicrographs, C-1045, 1 1/16" round, coarse grain, 75x, 4% Nital etch. The results: carbon restored to the decarburized skin; steel that sells and opens new markets for the processor.



Surface
STEEL MILL FURNACES

SURFACE COMBUSTION CORPORATION, 2408 DORR ST., TOLEDO 1, OHIO

Diamonds and Small Parts

SHAPED diamond tools are economical for the mass production of small parts only when high surface finish and exceptionally close tolerances are required. Outstanding examples are instruments and watches.

That is what I. A. Hurwitz and R. A. Kurtz, Hamilton Watch Co. scientists, told tool engineers at the ASTE Convention in Chicago.

They pointed out that diamonds require careful selection and orientation. Rough diamonds must be matched to the work. Stones must be free of flaws and inclusions. X-ray diffraction should be used to orient hard and soft planes before setting.

Machines that use diamonds must be free from shock and vibration.

Diamonds are economical because of long life and the high surface finish which eliminates the need for secondary polishing.

Standardizing Diamond Shanks

MARTIN HOERER, vice president, Golconda Corp., thinks shanks for diamond tools must be simplified. "The Industrial Diamond Association's handbook lists 188 types," he told the ASTE.

General Motors, Ford, Chrysler, General Electric and many other firms have committees studying proposed IDA standards.

Briefly, they are classified into: 1. Straight shank tools. 2. Headed shank tools.

The straight shank tools would be divided into four groups: No. 1. ¼-in. in diameter and 1 in. long. No. 2. ⅜-in. in diameter and 1¼-in. long. No. 3. 7/16-in. in diameter and 1½-in. long. No. 4. ½-in. in diameter and 3 in. long.

The headed shank tools would be divided into two groups called No. 10 and 11. No. 10 would be 1 in. long with a shaft ¼-in. in diameter by ½-in. long with a ⅝-in. head. No. 11 would be 1⅜-in. long with a shaft 7/16-in. in diameter by ¾-in. long with a ⅝-in. head.

Omitting the thread grinders, gear grinders and the specials, 142 shanks could be reduced to seven sizes.

Short Runs Get Spotlight

Engineers at Westinghouse's 20th Machine Tool Electrification Forum hint that they're working on automation for the small-lot production line

CLUES TO the machine tools you'll be using five and ten years from now showed up recently in the Hotel Statler, Buffalo. The occasion: The 20th Annual Machine Tool Electrification Forum, sponsored by Westinghouse Electric Corp.

A record number of engineers (520 registered the first morning) accepted Westinghouse's invitation to put their electrical problems on the table and to find out what others had in the works.

Avenue — Information flowed freely—traveling both ways. Engineers swapped ideas with fellow engineers, giving Westinghouse men an unusual opportunity to get an ear to the ground. At the same time, Westinghouse capitalized on the occasion to inform these potential customers on what was new on its books.

From the machine tool builders came evidence that the man who is faced with small production lots is receiving special attention. Automation is moving his way. For example:

• Jones & Lamson's tape-control turret lathe was designed for the large part of industry that "is concerned with the production of lots of less than 25 pieces." D. N. Smith, manager of development and research for the Springfield, Vt., builder, says the company chose to apply numerical control to a turret lathe because "we could demonstrate a high degree of operational flexibility and at the same time include a large percentage of all operations in the metalworking field."

To change jobs on this lathe, the new tools, preset in holders, are put in a hex and square turret and rear tool posts, and the new tape is slipped into place in the control console. Tape preparation for a new job is also said to be simple. Coding requires: "No more than planning the desired sequence of operations; adding and subtracting dimensions to produce required part size; translating this into a pattern of holes and transferring the pattern to the tape with a hand punch."

• IBM's tape control, set up on a cam-milling machine, manipulates the machine cycle so that a contoured cam is produced in one revolution of the blank; it can reduce the time of an operation to a tenth of that required for manual operation. Cams are turned out automatically; no operator attendance is required while milling goes on.

Help for DC—Westinghouse told its guests that the commercial availability of high-power silicon rectifiers will permit the machine tool builder to use direct-current motors and controllers where they used to be impractical. A small sandwich only ⅝-in. in diameter can carry 200 amperes and block 200 volts. The silicon buttons can be used to preclude expensive wiring of plants for direct current. Within the last few weeks, Westinghouse engineers said, silicon rectifiers have become competitive, pricewise, with other types of current rectifiers.

R. L. Bright, advisory engineer to Westinghouse Semi-Conductor Department, said: "The rectifiers will be used in the machine tool industry to convert alternating to direct current at the point where it is needed for direct-current motor drives, or any other operation requiring direct current, such as electrolytic machining and plating."

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- Abrasion and Erosion?
- Slag Attack?
- Overhead Applications?
- Insulating Properties Required?

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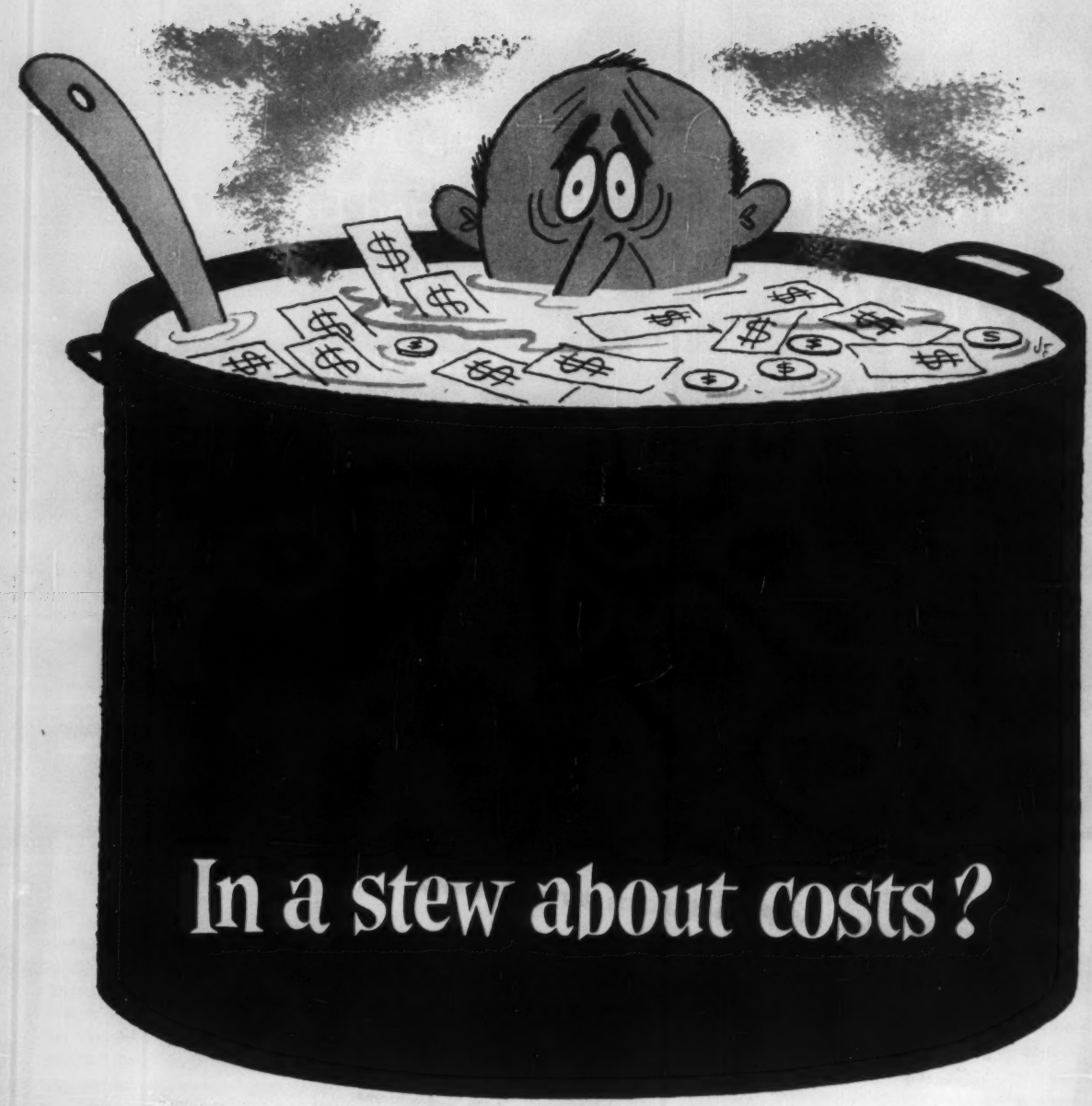

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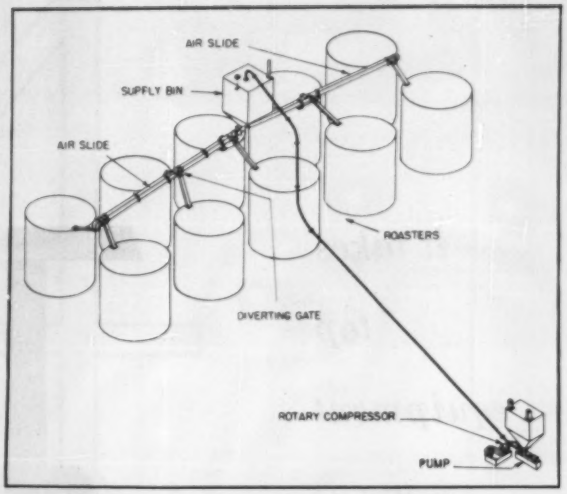


Hot metallic sulphide and oxide dust handling system

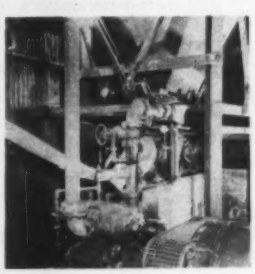
Conveyor for Hot Dust

DUST given off in roasting metallic sulphides is recovered by Cottrell precipitators and returned to the roasting furnaces at temperatures from 500 to 800°F at the Noranda Smelter, Noranda, Quebec.

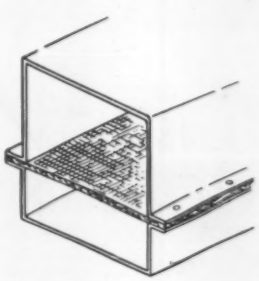
Key feature of the recovery system is an air slide of porous, refractory aluminum oxide which supports the dust and lets enough low-pressure air through to fluidize the dust so it will flow by gravity. The aluminum oxide slide is enclosed in a rectangular tube.

Operation—Recovered dust is gravity fed from a hopper into a Fuller-Kinyon pump, made by Fuller Co., Catasauqua, Pa. The pump feeds the dust into an air-mixing chamber where it is fluidized by compressed air. From the mixing chamber, compressed air at 15 psi delivers the dust, through a conveying line, to a supply bin above the roasters. From the supply bin, the dust is delivered, via the air slide, to the roasting furnaces.

For most applications, at normal temperatures—such as conveying cement, gypsum, soda ash, iron ore and lime—the porous medium in the air slide is a fabric.

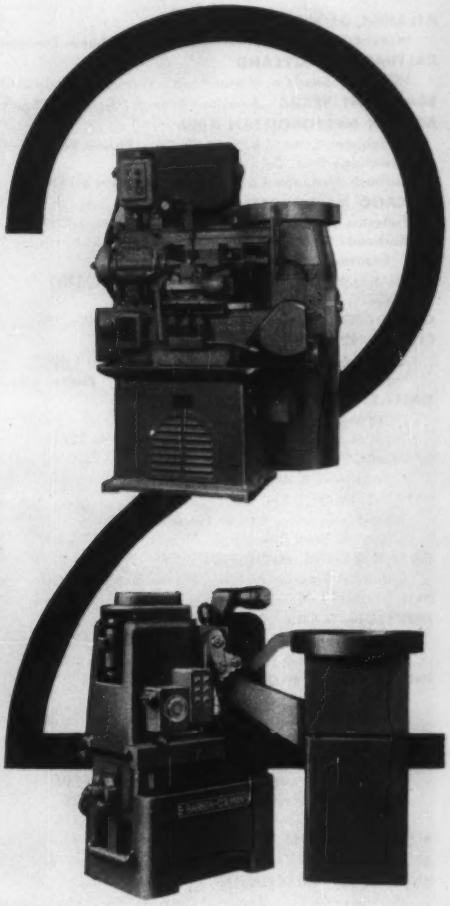


Screw element of pump feeds dust into air-mixing chamber



Air slide of aluminum oxide delivers hot dust to roasters

it takes top equipment to cut the best gears



BARBER-COLMAN offers

Superior Hob Accuracy

As a result of long experience and skill in hob manufacture, Barber-Colman offers a new concept of ultra-precision in hob tolerances. An example is a 48 DP Class AA hob, ground to total allowable lead variation of .00015" tooth-to-tooth, .00015" in any one axial pitch, and .0003" in three axial pitches. Tolerances such as these are only practical where machine and hob sharpening have equally close tolerances. We suggest you contact our engineers for recommendations when you have jobs requiring hobs of this accuracy.

For production hobbing, Barber-Colman makes Class A, Class B and Class C hobs. Classes A and B are ground on the form and are recommended for accurate finishing and semi-finishing. Class C Accurate Unground hobs are used primarily on preshaved gears. All hobs are well within the standard tolerances for their particular class and pitch.

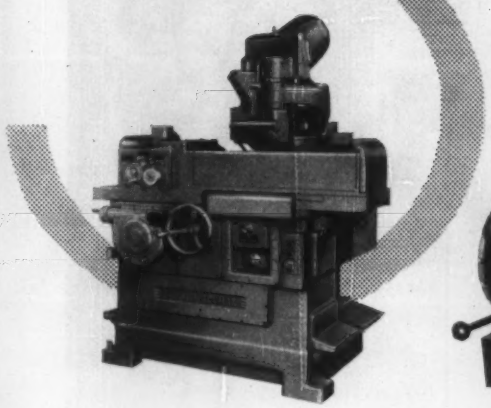
Automated Gear Production

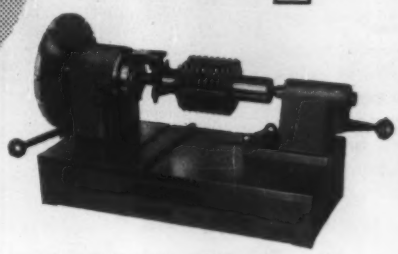
For high speed, mass-production gear problems, Barber-Colman engineers have developed fully automatic hobbing machines, including magazine or hopper-feed loading, fully automatic cycle and automatic hob shifting.

For maximum production of specific parts, machines are designed with special purpose tooling, loading, gaging and handling to suit the requirements for accuracy and finish. Such machines may also include inspection, rejection, and size-gaging as part of the automatic cycle.

General purpose hobbing machines are available for hobbing parts up to 16" diameter, from 3½ DP to the finest pitches. A variety of special tooling can be furnished — hydraulic, pneumatic, electric — to give maximum accuracy and production efficiency for the particular problem.

345





Controlled Hob Sharpening

The inherent accuracy in Barber-Colman hobs and hobbing machines may be upset if all factors are not in adjustment. A common cause for loss of accuracy is error in resharpening hobs. To provide positive sharpening control on a production basis, and to insure maximum accuracy in sharpening, Barber-Colman engineers have developed a series of automatic sharpening machines. With these machines the sharpening operation becomes simple, fast and convenient, and original tool accuracy is easy to maintain.

Hob Sharpening Inspection

The Barber-Colman Hob Sharpening Checker is a precision instrument for measuring the accuracy of face sharpening on straight and helical fluted hobs. The precision found in Barber-Colman hobs is inherent and the only place it can be lost is in the sharpening operation. Reasonable in cost, this checker furnishes a convenient method for checking the sharpening accuracy.

Gear Cutting Service

Barber-Colman hobbing engineers, backed by years of experience in the field, and special skills acquired in production hobbing of gears, are available without cost to analyze and make recommendations on gear problems. This service will help to maintain peak efficiency in your gear cutting operations. Send us inquiries about accuracy, tooling, production and special toothforms.

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PART FIVE

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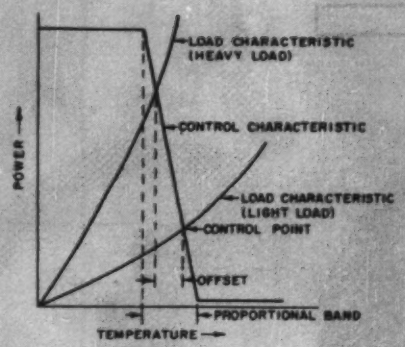
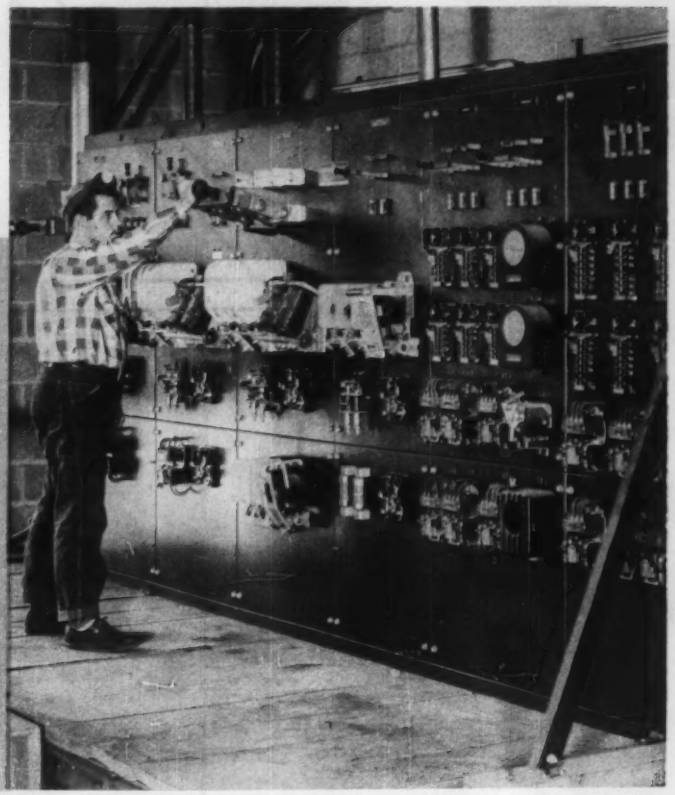


Proportional Control provides more accurate temperatures than two-or-three-position control. Typical applications are aluminum brazing, sintering and laboratory furnaces



This relay and control panel is for a roller hearth furnace used for brazing, hardening and quenching. The operator is about to close the main switch

Control Systems

INDUSTRIAL FURNACES are controlled by changing the power input rate.

Two-position control, with its companion on-off control (a special form), is the simplest and most important system. The conditions necessary for its successful use are found in electric and fuel-fired furnaces.

In two-position control, the instrument operates the final control element to turn the power on just below the set point and to turn it off just above the set point. The spread between the on and off temperatures is called the differential.

Limits—Such a system is unstable and can control only by continuous cycling. Its success depends on: 1. The capacity of the load mass which acts like a flywheel (the larger, the better). 2. The response of the sensing device to changes in furnace temperature. (Don't bury it in the work or a muffle; locate it between the heat source and the work.) 3. The reaction rate. (The furnace must not heat nor cool too fast—power input must be a little more or less than demand.)

The ideal condition exists when demand is about 50 per cent. The load temperature variation may be less than the differential gap. This will be the case if the load has high mass or if it is separated from the temperature sensing device by a resistance, such as a retort.

Interrelationship—All these factors (response, reaction rate, capacity and resistance) are interrelated. The effect of any one depends on its magnitude in relation to the others. With a differential gap of 0.5 per cent, typical of most control instruments, the temperature of an electric furnace will vary about 1 per cent with a steady load. With normal changes in demand and supply voltage, this variation may be doubled.

Capacity and resistance of the load will minimize the effect of temperature cycling. Most of the load temperature variation is due to changes in demand. Two-position control alone may not be adequate if demand changes are large.

Two-Position Control—On electric furnaces, two-position control means on-off control, since contactors are the final control elements. Most larger contactors have inrush or holding currents that

exceed instrument rating. To overcome this, a relay is used. (See STEEL, Apr. 2, p. 110.)

On gas-fired furnaces, on-off control can be obtained with a solenoid valve, using the contactor control circuit. It is more common to use a butterfly valve with a unidirectional motor.

One advantage is that the valve need not be turned fully open or closed. It can be adjusted to operate between two intermediate positions. This permits adjusting the heating and cooling rates for the best conditions. With gas furnaces, a partially opened valve produces less than normal flame length. This may upset temperature uniformity within the furnace.

Proportional Time—A special form of two-position control, called proportional-time control, is used to reduce cycling variations. This produces a constant, adjustable cycle length, shorter than ordinary two-position control. As the average temperature shifts up and down, the percentage of "on-time" increases and decreases.

By adjusting for best cycle time, overshoot and undershoot can be kept to a minimum. Further, cycling is produced by independent means—it is not necessary for the controlled temperature to cycle at all, provided the cycle time is made short enough.

Such controls produce excellent results, particularly on gas-fired furnaces where it is not feasible to throttle the flame. Good results are also obtained on electric furnaces at the expense of greater contactor maintenance. The cycle time on electric furnaces should always be made as long as possible.

Multiposition Control—This is a logical extension of two-position control. Three positions, high, low and off, are most common, although more can be used. This gets around the weakness of two-position control on batch furnaces. Such furnaces require high power input for rapid heatup and are overpowered when the load reaches temperature. With three positions, the high power will be applied until the temperature reaches the lower set point, after which the control will cycle between low and off.

The easiest way to get three-position control is to use it to reconnect the heating units from delta to Y. Transformers can be reconnected or shifted to different taps providing an intermediate power input. Series-parallel or Y-series connections may be used.

If the high or low heat only is required, the shift can be made manually. Even if three-position control is not required, a low heat connection can be used to prevent overheating during idling periods. Y-delta switches are standard equipment on stereotype melting pots in newspaper plants.

On gas furnaces, three-position control can be provided by solenoid in series with a high-low valve.

Three-position control requires two separate sets of contacts in the same instrument. These can be provided easily in either millivoltmeters or potentiometers.

Floating Control—So named because the final control element floats from one position to another, it is most often used with motor-operated valves. It can be used with contactors by varying their "on-time" percentage. In the most frequently used single-speed floating control, the instrument has two contacts similar to those for on-off control but adjusted for larger differential. When the temperature reaches the high setting, the contact closes and drives the valve toward the closed position. The reverse occurs on low temperature.

To avoid rapid cycling and

Which Control System?

Use Two-Position or On-Off Control:

- When the temperature detector can sense temperature changes quickly
- When the furnace or work heats and cools slowly
- On most electric furnaces
- On most radiant tube furnaces
- On open-flame furnaces where full flame length is desirable to give temperature uniformity
- On open-flame furnaces where furnace pressure or fuel-air ratio is not controlled, and where products of combustion are not used as a protective atmosphere

Use Multiposition Control:

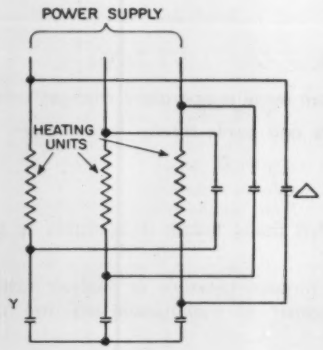
- When two-position causes too much overshooting on initial heating
- When changes in demand are large and prolonged, or there are long periods of idling

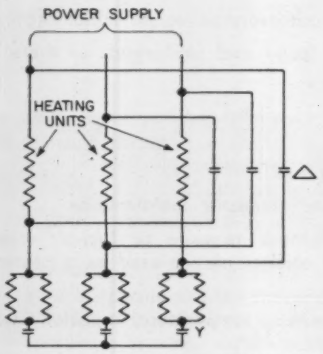
Use Proportional Control:

- For continuous flow of power or fuel
- On electric furnaces to eliminate contactor maintenance
- On fuel-fired furnaces where furnace pressure or fuel-air ratio is controlled, or where products of combustion are used as a protective atmosphere
- When there is time lag in measuring temperature, especially where load changes are small
- When closer temperature control is required than can be provided by two-position control

Use Automatic Reset and Rate Action with Two-Position or Proportional Control:

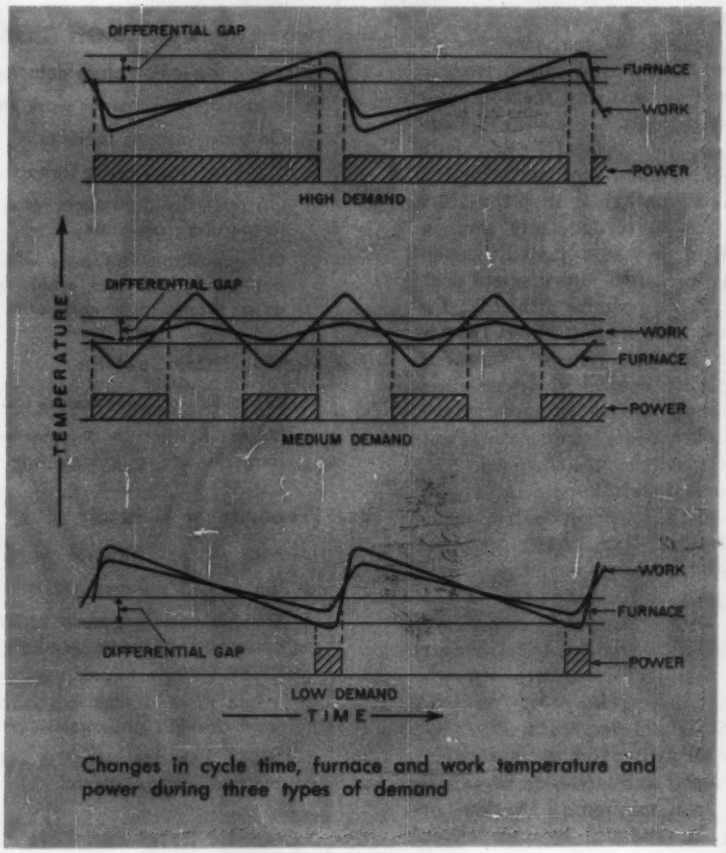
- When the most accurate possible control is desired, particularly under adverse conditions
- When there is appreciable time lag in sensing temperature and/or there are large and frequent demand changes





Y-Delta contactor connections for three-position control

Y-Delta, plus proportional control connections



Changes in cycle time, furnace and work temperature and power during three types of demand

valve wear, the valve is slowed (damped). The temperature then floats in the differential gap.

The drawbacks of floating control are: Fast reaction rate or slow load change. Fortunately, neither exists in industrial furnaces. Floating control has been used to control the flow of air through the cooling section of slow-speed continuous furnaces. As long as load changes are slow enough, it will operate successfully. Its advantage over two-position or proportional control is that it automatically compensates for load changes. Its chief application, in a more complex form, is automatic reset or load compensation for other forms of control.

Proportional Control—With this control (see graph, page 112), the power (or fuel) is inversely proportional to temperature.

When power is applied to an empty furnace with proportional control, the temperature will increase until the power input just equals the losses. Above this temperature, the input will be less than the losses, so temperature remains constant.

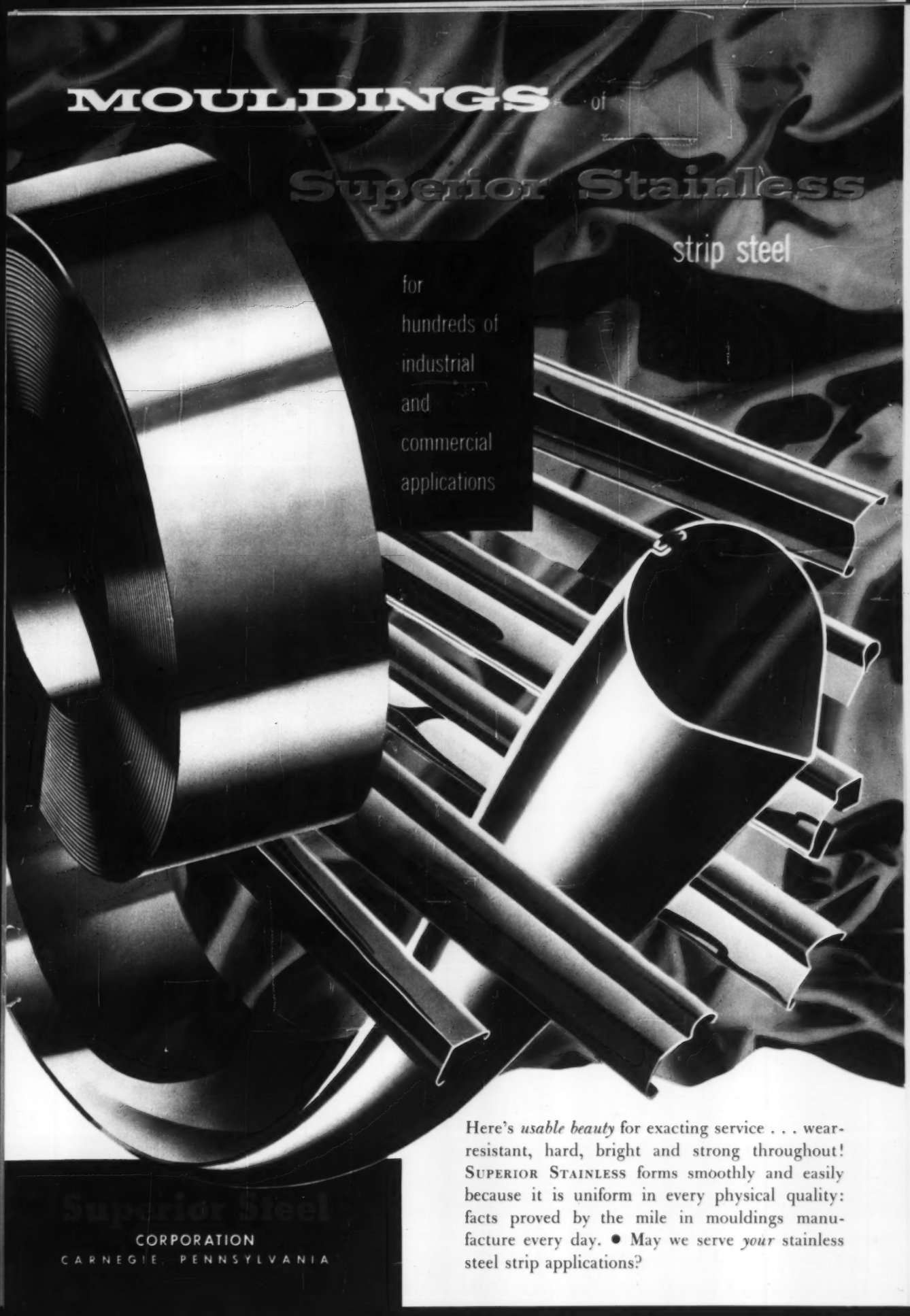
When work passes through the furnace, more power is required to maintain any temperature. For power to increase, temperature must decrease until input again equals demand. The control point will now be at a lower temperature. The decrease is called offset or droop and is characteristic of all proportional controls. Its size will depend on the width of the proportional band, and the size of load change. The width of the proportional band depends on the time lags in the furnace and control.

Proportional control may be used when either load changes or measuring time lags are large. When load changes are great, the proportional band may be small enough to eliminate offset. When measuring time lags are great, the proportional band can be made wide enough to insure straight-line control. The reaction rate is not critical.

Saturable reactors are used to control electric furnaces. The chief disadvantage of saturable reactors is cost.

On gas-fired furnaces, either proportional-power (fuel) or proportional-time control is used. In proportional-fuel control, a motor er pneumatic valve throttles the air or gas. This is frequently used with open-burner furnaces and is little more expensive than on-off control. For radiant tube furnaces and where it is undesirable to reduce flame length, the proportional-time control is better. The operation is similar to contactors.

Proportional control provides more accurate temperatures than



Here's *usable beauty* for exacting service . . . wear-resistant, hard, bright and strong throughout! SUPERIOR STAINLESS forms smoothly and easily because it is uniform in every physical quality: facts proved by the mile in mouldings manufacture every day. • May we serve *your* stainless steel strip applications?

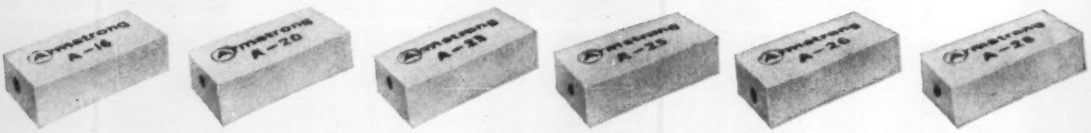
Superior Steel
CORPORATION
CARNEGIE PENNSYLVANIA

Bond... strong mortar bond is provided by clean surfaces of Armstrong Insulating Fire Brick

Unusually high strength prevents excessive dusting when surfaces of Armstrong Insulating Fire Brick rub together during transportation or handling. The clean, dust-free surfaces and uniform texture of these brick allow good mortar penetration and well-bonded constructions.

Send for free booklet giving full information on the entire line of Armstrong Insulating Refractories. Address Armstrong Cork Company, 2704 Reed Ave., Lancaster, Pa. For help with your next furnace building or lining job, call in your Armstrong engineer.

Armstrong INSULATING REFRACTORIES



two-or-three-position control. Typical examples are aluminum brazing, sintering and laboratory furnaces.

Proportional-power or fuel control is also used where continuous flow of power or fuel is needed as in gradient heating of continuous strip or webs and nonrecirculating air or gas heating. For these applications, the reaction rate is so high that two-position control might produce large temperature swings. Proportional control is necessary on fuel-fired furnaces in which the fuel-air ratio or furnace pressure are controlled, or where the products of combustion are used as a protective atmosphere.

Automatic Reset — Changes in demand or heat requirements exist in every furnace application. Even a batch furnace changes demand while reaching equilibrium. Demand changes are always possible in continuous furnaces unless loading is constant. Demand change equivalents are changes in supply voltage or fuel characteristics.

When demand changes are great enough or when the closest control is needed, automatic reset is used. (It is a combination of a floating control with another control system.)

When used with proportional control, automatic reset shifts the control characteristic to one side or the other to keep the control point the same.

Rate Action—Frequently tied in with automatic reset is rate action, which is superimposed on the other methods. Rate action affects the input as a function of the rate of change. It counteracts time lags and reduces overshoot.

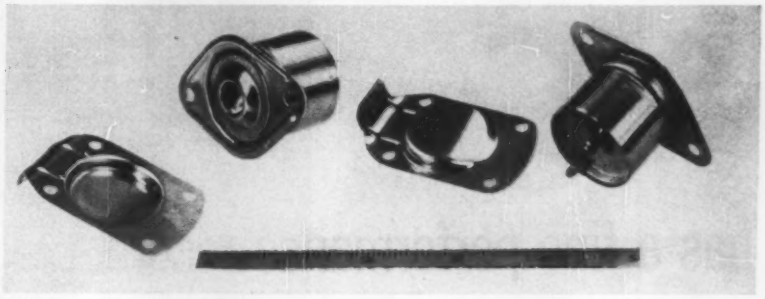
Three-action control combines proportional, reset and rate. It is necessary when both load changes and time lag are large. A typical application is the radiant heating of continuous strip where control is based on the strip temperature. It will provide the closest control on any application.

The final installment (May 7) discusses specialized control systems.

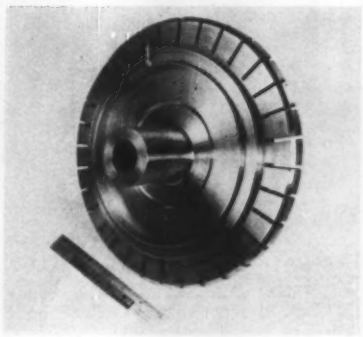
An extra copy of this article, one of six in a series on temperature controls, is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

Economize with Stainless

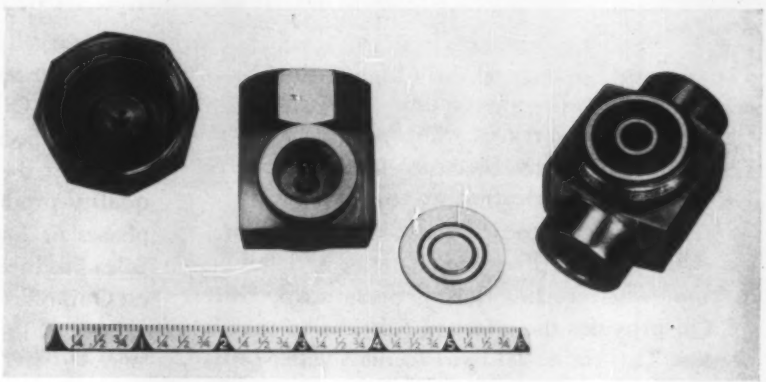
HERE are three ideas for getting "more stainless for your nickel" from the files of Carpenter Steel Co. (see page 92). They are typical of the myriad ways in which the straight-chrome grades serve.



Safety Door Lock: This little device prevents automobile doors from being opened accidentally. During experimental work, chrome-plated, cold-rolled steel was tried. Type 430 stainless, 0.025-in. gage, proved to be the better material for strength, corrosion resistance, finish and economy



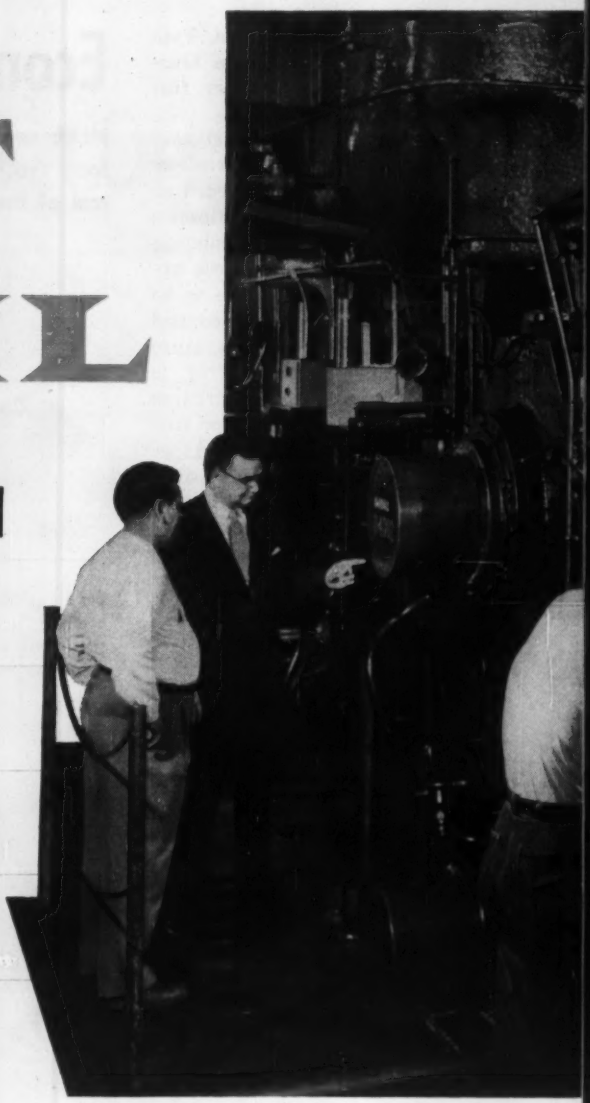
Candy Cutter: This revolving disc holds cutting knives in a caramel candy wrapping machine. The job called for high strength, corrosion resistance (to stand the attack of sugar and fruit acids) and excellent machinability. Originally, 18-8 was specified; it turned out to have higher corrosion resistance than necessary. Type-416, straight-chrome stainless does the job just as well at less cost



Steam Trap: This was originally a steel casting. Redesigning the trap for stainless brought 20-per-cent savings in material and machining costs. The trap has one moving part—the disc. Here are the stock specifications that cut costs: Body: 2⅜-in. square bar, type 420F; disc: 0.101-in., type 420; head 2⅜-in. octagon bar, type 416

"GULF I-C OIL

has a fine performance record in our mill — 14 years without a bearing failure attributable to lubrication"



*says one of the larger brass mills in the United States**

The Morgoil bearings on the 4-high United Tandem mill at this plant have been lubricated with Gulf I-C Oil since it first went into operation in 1942. And there have been no bearing failures attributable to lubrication up to this time.

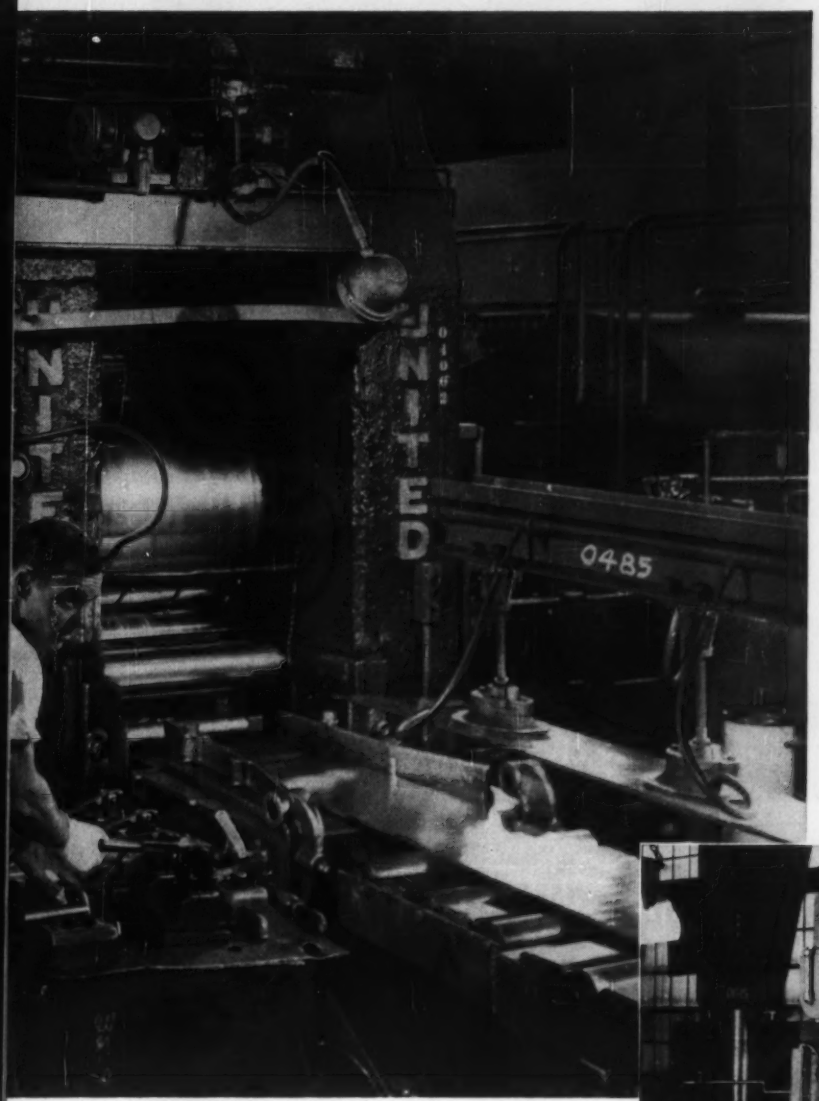
These bearings require the best possible lubrication to withstand heavy loads over a long period of time when rolling heavy brass strip. Gulf I-C Oil provides the effective lubrication that is needed. This stable oil has excellent water-separating characteristics and resists sludge formation. These important advantages — plus outstanding lubricating qualities — contribute to continuous operation and lower maintenance costs.

Another outstanding Gulf product, Gulf Stainless Metal Oil, was selected as the roll oil by this company because it gives the desired finish.

To get the many benefits possible with these quality products, and for expert help on other phases of improved lubrication, call in a Gulf Sales Engineer. Write, wire, or phone your nearest Gulf office.

Gulf Oil Corporation · Gulf Refining Company
1822 Gulf Building, Pittsburgh 30, Pa.

**Name furnished upon request.*



The Morgoil bearings in this 4-high United Tandem mill are lubricated with Gulf I-C Oil and have been for 14 years.

Single Stand 2-high rolling mill where Gulf I-C Oil contributes to smooth production. The roll oil in use is Gulf Stainless Metal Oil.

GULF

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS

Abrasion Tester

Determining how well a surface will wear can be done with an instrument like this one

A SIMPLE, rapid device that determines the abrasion resistance of porcelain enamel is announced by the National Bureau of Standards. It tests different finishes, including orange peel and wavy surfaces.

Importance — Abrasion resistance is important in determining the performance of protective coatings. Floor coverings, enameled sinks and cooking utensils are scoured with cleaning abrasives.

All enamels are not equally resistant to abrasion. The laboratory must determine in advance how well certain porcelain enamels will resist wear.

The instrument is essentially a motor-driven table that oscillates in a 7/8-in. circle at 300 rpm in a horizontal plane. The motor is a synchronous type, controlled by an electric timer. Nine specimens can be tested at one time.

Operation—A specimen is placed in position on the table and secured with a rubber-coated, aluminum retaining ring. An abrasive charge (3 grams of grit, 175 grams of 5/32-in. stainless steel balls) and 20 milliliters of water are poured into an accessory hole on top of the retaining ring. The stainless steel balls increase the effectiveness of the grit.

Two tests are used; one determines the surface abrasion resistance for appearance standards, the other checks subsurface resistance.

The first test takes 5 minutes. The grit is Pennsylvania glass sand, 70-100 mesh. Specular gloss is measured before and after.

The second test (45 minutes) follows. Coarse, fused alumina is the grit. The specimen is weighed every 15 minutes and an abrasion-time, weight-loss curve is plotted. Fresh abrasive is inserted between each 15-minute period.

Results have shown agreement with field experience. In addition, the method can be adapted for use on highway paints, plastic and fibrous materials and organic finishes. The tester was developed with the co-operation of the Porcelain Enamel Institute.

While one inspector feeds small parts into the inspection channel (the x-ray tube is in the lead-shielded box at left) . . .

Another inspector monitors rejects from a slave receiver tied in with the one above

TV Joins X-Ray for Inspection

X-RAY AND TV combine their talents in the inspection of small heating elements for a midwestern maker of household appliances.

An x-ray beam is passed through the heating elements and strikes a photoconductive layer of lead oxide on the inside of a special TV pick-up tube. A 250-volt electron beam reads the latent image on the oxide layer and presents it, electronically amplified, on a typical television viewing screen.

The amplification system, devised by Dr. John E. Jacobs and Harold Berger, General Electric Co. engineers, is used as a quality control instrument. It replaces a fluoroscope formerly used for inspecting insulation on the heater windings. The manufacturer was happy with fluoroscopic inspection until the TV amplifier turned up many previously missed flaws in the heating elements.

Eye Opener—The system does more than enlarge the image, intensify it and increase definition. It permits much lower x-ray voltages to be used (in the example above, the 125,000 volts required for the fluoroscope were cut to 70,000 volts).

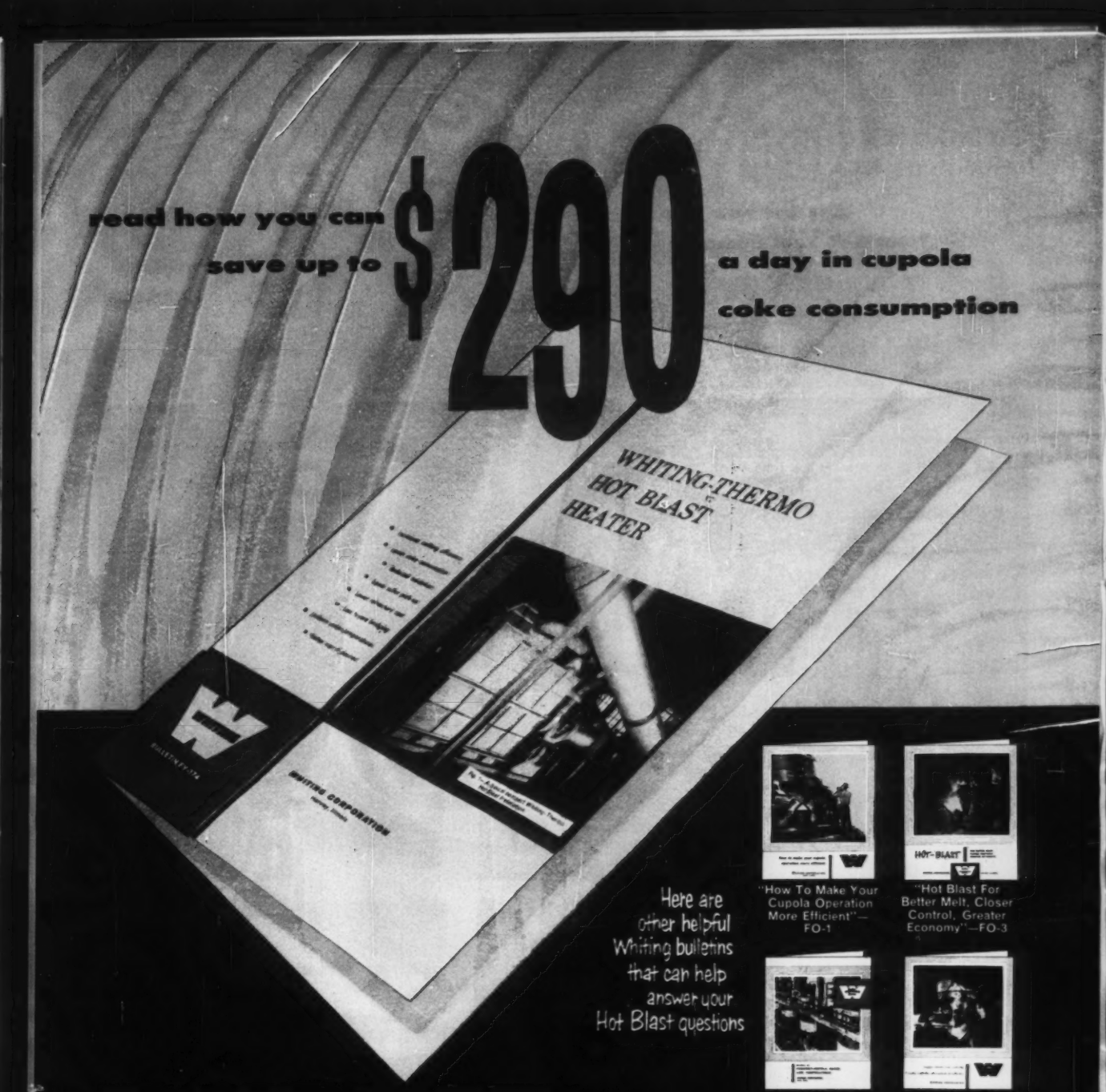
Contrast can be varied to suit, viewing is instantaneous and there can be any number of viewing stations. Because viewing is remote, there is no health hazard. The image is easily photographed. It can be stored as an electrical signal on magnetic tape.

The device can be used to compare the image electronically with a standard (absorption negative) and cause rejection of objects differing from the standard.

Much Ahead — The system is still undergoing industrial testing. Look for it to become a production line inspection tool.

It is being tested at voltages as high as 1 million with the hope of making possible direct fluoroscopic inspection of dense materials such as steel.

read how you can save up to $290 a day in cupola coke consumption



Here are other helpful Whiting bulletins that can help answer your Hot Blast questions

"How To Make Your Cupola Operation More Efficient"—FO-1

"Hot Blast For Better Melt, Closer Control, Greater Economy"—FO-3

"Review Of Foundry-Cupola Gas and Temperatures"—FO-9

"Suggestions For Solving Some Cupola Operation Problems"—Bulletin FO-8

Based on an average 400-ton per day cupola melt, pre-heated blast can raise metal temperatures and at the same time create a 28% coke savings! This is possible at an expenditure of only $45 in gas fuel, giving an actual fuel savings of $290 per average work day and many thousands of dollars per production year.

Now any cupola can be converted at low cost with a Whiting-Thermo Hot Blast Heater to provide the highest efficiency in hot blast. Whiting has prepared a new booklet on this cost cutting hot blast heater which tells about all hot blast advantages. It also fully describes burners, combustion chambers, heat exchangers, air booster fans, control panel and controls, auxiliaries, and air by-pass as well as general design features. Write for this free booklet today! Ask for Bulletin FY-174. Ask for the other bulletins shown also!

WHITING

WHITING CORPORATION

15643 Lathrop Avenue • Harvey, Illinois

See the new Saw from C-B Tool Company

IT WEIGHS LESS, COSTS LESS, WORKS BETTER

The C-B Tool Co. Story

It was easy! Engineers from C-B Tool Company, Lancaster, Pa. and OSTUCO in Shelby worked out a welded steel tubing component to replace a heavy, bulky oil reservoir and to serve as a handle for the new saw. See the difference this makes in the new Lancaster Model 400A chain saw:

- **Saves Cost—$4.25 on each chain saw!**
- **Saves Weight—3 pounds on each unit!**
- **Works better—Saw now has positive, continuous oiling instead of push-button oiling by the operator.**

Perhaps this story from C-B Tool has a message for you.

If you have trouble with see-sawing production costs and quality, OSTUCO may have the answer to your problems. Unique single-source service eliminates interplant shipment, reduces error, gives better production control. See about it . . . see OSTUCO! Contact the Shelby office or your nearby OSTUCO Sales Engineer for details.

OSTUCO TUBING

SEAMLESS AND ELECTRIC WELDED STEEL TUBING —Fabricating and Forging

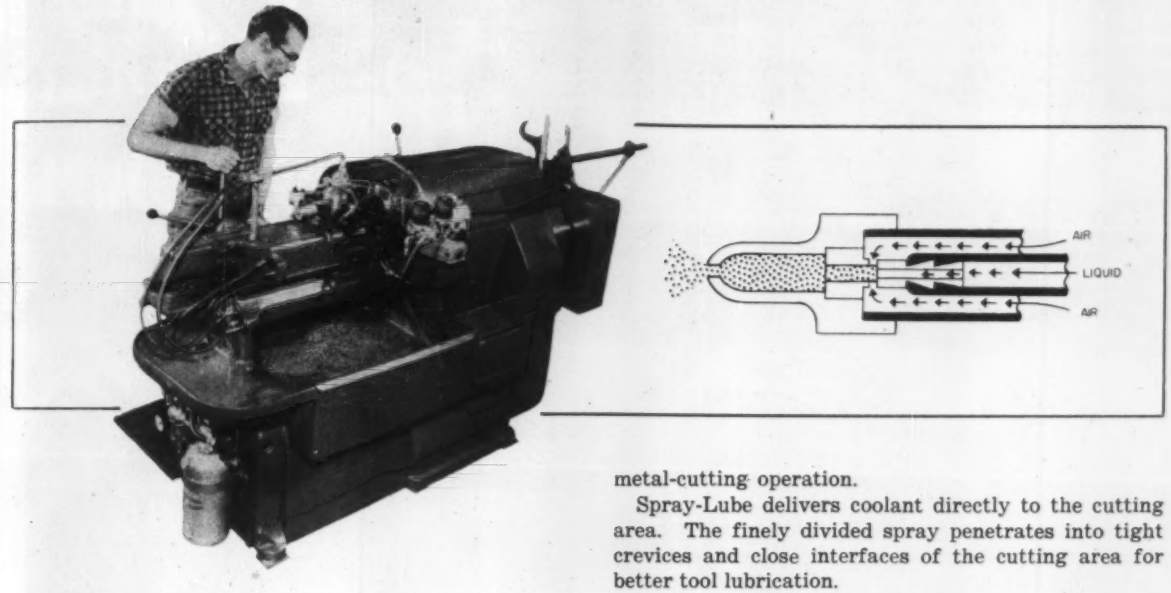
OHIO SEAMLESS TUBE DIVISION
of Copperweld Steel Company • ***SHELBY, OHIO***
Birthplace of the Seamless Steel Tube Industry in America

SALES OFFICES: *BIRMINGHAM • CHARLOTTE • CHICAGO (Oak Park) CLEVELAND • DAYTON • DENVER • DETROIT (Ferndale) HOUSTON • LOS ANGELES (Beverly Hills) • MOLINE NEW YORK • NORTH KANSAS CITY • PHILADELPHIA PITTSBURGH • RICHMOND • ROCHESTER • ST. LOUIS ST. PAUL • SALT LAKE CITY • SEATTLE • TULSA • WICHITA*

CANADA, *RAILWAY & POWER ENGR. CORP., LTD.*

EXPORT: *COPPERWELD STEEL INTERNATIONAL COMPANY 117 Liberty Street, New York 6, New York*

Spray Lubrication Speeds Metal Cutting



The Brown & Sharpe hand screw machine uses an improved Spray-Lube system for the turret-head cutting tools.

Air and liquid are brought to the nozzle by a tube within a tube. Mixing the spray in the nozzle insures high quality and uniformity.

Spray is delivered to the cutting tool the instant the machine is turned on. There is no sputtering or intermittent spray, even at low flows.

Simple adjustments of needle valves regulate the flow of air and liquid to give the right spray for any metal-cutting operation.

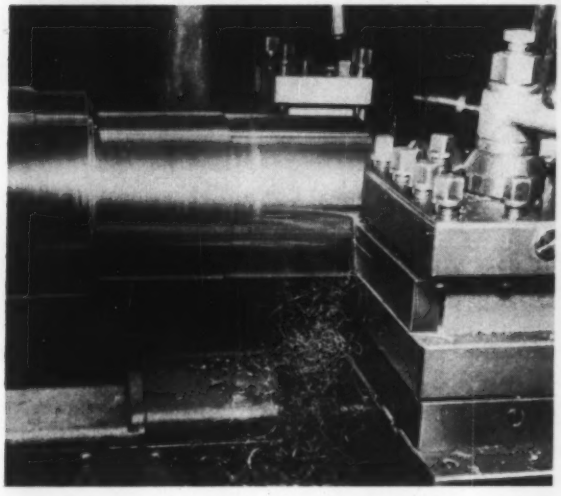
Spray-Lube delivers coolant directly to the cutting area. The finely divided spray penetrates into tight crevices and close interfaces of the cutting area for better tool lubrication.

Rapid cooling at the cutting point makes for increased speed and feed, while workmanship is improved and tool life lengthened.

On most operations, only 4 to 12 fluid ounces of cutting oil per nozzle per hour are needed.

The heat of the tool and workpiece is rapidly and thoroughly dissipated because a sprayed coolant exposes a greater fluid surface area and absorbs more heat. The use of compressed air adds another cooling factor. *Write*: C. A. Norgren Co., 3400 S. Elati St., Englewood, Colo. *Phone*: Sunset 1-5586

Ceramic Tool Makes Both Fine and Heavy Cuts



Sintox tooling consists of two parts, shank and insert. The chip breaker and chip groove are built in.

One grade of the aluminum-oxide base material is equally efficient on all materials. The insert is cheaper to replace than to regrind.

Hardness of the insert is between that of a sapphire and diamond.

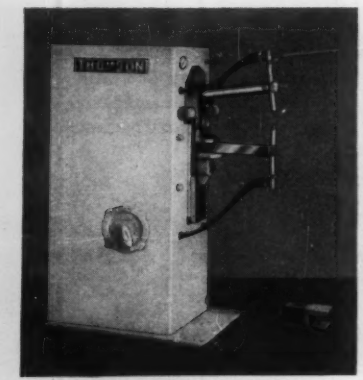
Sintox inserts can be used to take a cut from 0.00025-in. to full depth. A heavy cut: On a steel bar 6 in. in diameter, turned at 200 sfpm, depth of cut is 0.200-in. at 0.077 ipr feed.

On a medium cut, a steel bar 6 in. in diameter is turned at 900 sfpm, with 0.125-in. depth of cut at 0.014 ipr feed.

On an extremely fine cut, a steel bar 5½-in. in diameter is turned at 1500 sfpm, with a 0.0005-in. depth of cut at 0.005 ipr feed. *Write*: Sintox Corp. of America, Allentown, Pa.

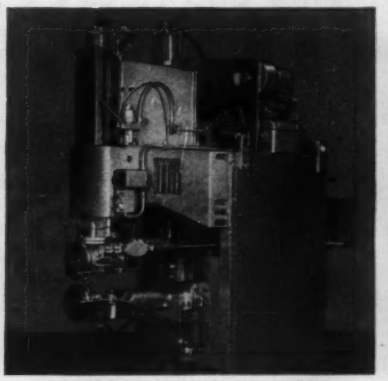
THOMSON

HANDLE RECEIVERS are attached to stainless steel pans — a typical projection welder application. Result: high production, low unit cost, strong welds, no marring of high finish.



NEW SPOT WELDERS

Model RA Spot Welders extend the complete line—provide low cost equipment for utility or production work.



THOMSON SEAM WELDERS

Sizes range from 50 to 400 KVA. Models for circular, longitudinal or universal seaming to exacting specifications.

"SYNCHRO-MATIC" FLASH WELDERS

This exclusive THOMSON development has set new standards for flash-butt welding nonferrous as well as ferrous metals.

specialists in the broad field of RESISTANCE WELDING EQUIPMENT

The THOMSON line is truly complete — ranging from simple, low cost, standard machines to highly specialized production welding equipment. It includes all standard resistance welding types — spot, projection, seam and flash-butt — as well as electro-brazing, electro-forging, upsetting and related equipment.

THOMSON also offers complete engineering, laboratory and experimental facilities to help develop the most effective welder for any application — plus an organization of capable representatives in all metalworking centers to make this service conveniently available to you.

Keep THOMSON in mind when you need resistance welding equipment, technical assistance or the recommendations of the foremost resistance welding specialists.

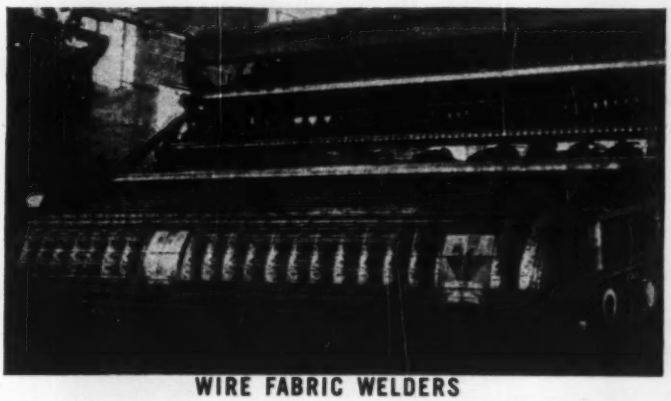
VISIT BOOTHS 118-119 WELDING SHOW **BUFFALO, N. Y., MAY 9-11**

FOUNDED IN 1886 BY ELIHU THOMSON

INVENTOR OF RESISTANCE WELDING

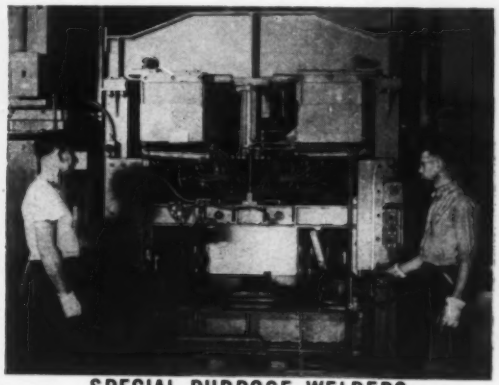
THOMSON *Welders*

THOMSON ELECTRIC WELDER COMPANY, LYNN, MASS.



WIRE FABRIC WELDERS

Typical of the many special THOMSON designs which have become standard in their fields of application.



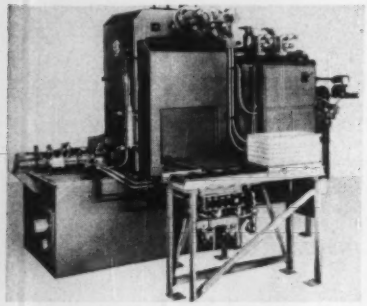
SPECIAL PURPOSE WELDERS

Designed to do one job in the most effective, economical way. Automation applied to resistance welding.

NEW PRODUCTS and equipment

Automated Batch Furnace

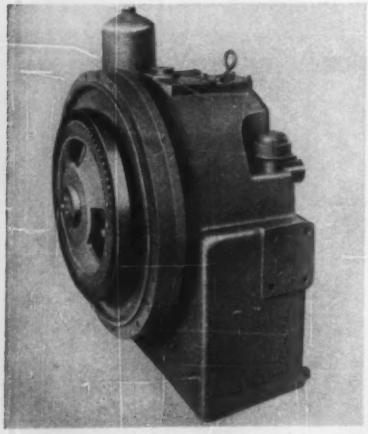
A controlled atmosphere furnace preconditions, loads and unloads the work chamber and quenches the processed charge without operator handling and loss of time.



Gross capacity is 800 lb an hour; temperature range is 1450 to 1700° F. An oil quench (70 to 190° F) permits carburizing, carbonitriding, carbon restoration and clean hardening. *Write*: Dow Furnace Co., 12045 Woodbine Ave., Detroit 39, Mich. *Phone*: Kenwood 2-9100

Torque Converter

Differing from other single-stage torque converters, the 1500 Series features "unloading" of the engine. The blade design causes the turbine to develop a counterhead which stops fluid circulation at high speed ratios.

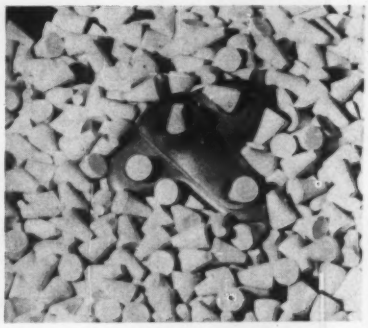


Another important design feature: Impellers having different bladings (both number of blades and pitch) are interchangeable. The converter's torque capacities can be matched as accurately as possible to engines of various horsepowers and speeds, within rated limits, without changing the converter housing or other components.

The 1500 Series is for engines producing from 30 hp at 1150 rpm to 198 hp at 2400 rpm. Torque ratings are 165, 200, 240, 285 and 330 ft-lb, depending on the impeller blade. Four models are available: Model C, with clutch input; Model S, with spider-drive input; Spacer-Type Model S, with a double-ended SAE housing; Model U, with flange input and flange output. *Write*: Hydraulic Division, Twin Disc Clutch Co., Rockford, Ill. *Phone*: 4-5664

Barrel Finishing

Honite Ceramicones barrel-finish intricate parts that formerly could not be finished because of lodging problems.



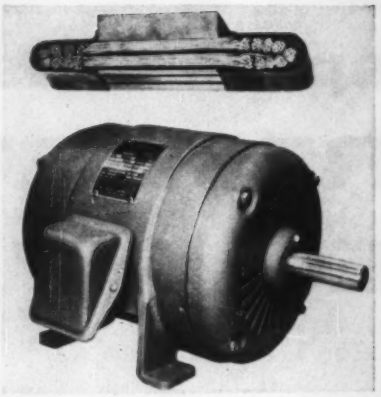
The conical ceramic shapes reach into holes for deburring, but their broad bases prevent lodging.

The cones are ½-in. high, ⅜-in. through the base and 7/32-in. across the top. Practically every surface on the workpiece is reached. *Write*: Department F6-48, Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn. *Phone*: Tower 8511

Motor Line

The new line of Linc-Weld motors features extruded plastic insulation. Available in 1 to 40-hp sizes, they are built with open frame, torque design B and comply with the new NEMA specifications.

The thermosetting plastic insulation is molded into and around the stator windings (see photo).



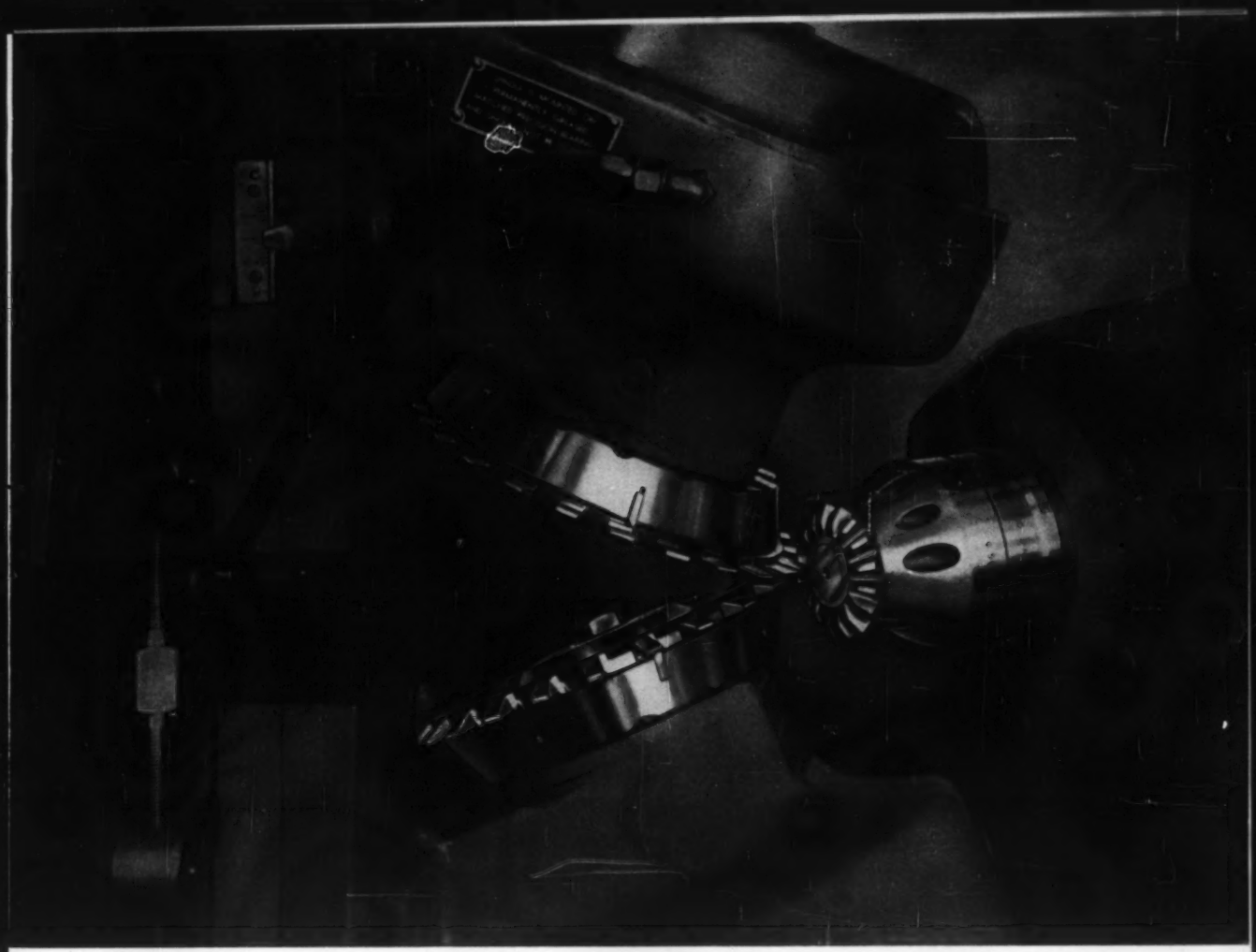
The motor stator is placed in a die and the plastic material forced into the die under heat and pressure. The liquid plastic resin is extruded through the stator slots, completely covering the stator winding.

In field tests, the plastic has demonstrated exceptional resistance to chemical action, humidity, abrasive dust, lint and oil vapor. The plastic also provides thermal and physical protection for the stator winding. *Write*: Lincoln Electric Co., Cleveland 17, O. *Phone*: Ivanhoe 1-8100

Static Switches

Although similar to its prototype in basic circuitry and logic, the Mark II Cypak static switch offers greater simplicity, lower system cost and greater efficiency in space use.

The new components are modular plug-in cartridges about 3 in. high, 2 in. wide and 2 in. deep. Enclosed in a tough, polyester resin and fitted with terminals on the upper and lower frames, the mod-



How to multiply production of straight bevel CONIFLEX® gears and pinions *by as much as 500%*

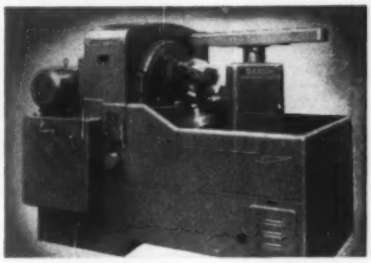
You can do it with the new No. 104 Straight Bevel CONIFLEX Generator.

The two interlocking disc-type cutters, with 24 blades each, *complete a gear in one rapid operation.*

This is the key to the remarkable performance of this new Gleason machine which achieves production rates up to 5 times as fast as any previous generator. In addition, a new generating method insures high efficiency, excellent finish, and maximum cutter life.

The range of capacity, and the ease of setup, make the No. 104 Straight Bevel CONIFLEX Generator ideal for jobbing.

Calculations have been reduced to a minimum and can be done long hand or with slide rule.



The No. 104 Straight Bevel CONIFLEX Generator completes gears up to 8½" diameter and 1⅜" face width, and from 20 to 3 DP.

We will be glad to send a bulletin giving further details on request.

® Straight bevel gears with localized tooth bearing.

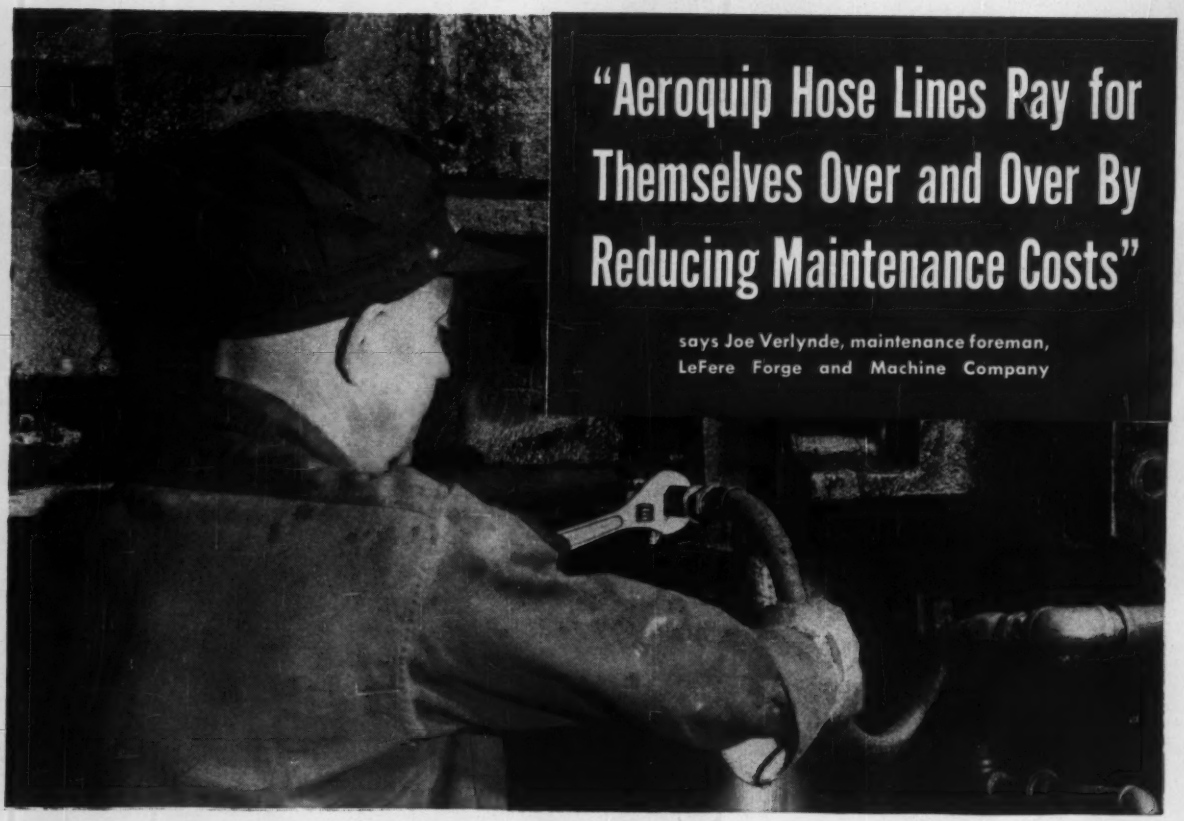
GLEASON WORKS

Builders of bevel gear machinery for over 90 years

1000 UNIVERSITY AVE., ROCHESTER 3, N. Y.

"Aeroquip Hose Lines Pay for Themselves Over and Over By Reducing Maintenance Costs"

says Joe Verlynde, maintenance foreman, LeFere Forge and Machine Company



Above: Maintenance Foreman Joe Verlynde finds it easy to install Aeroquip Hose Lines because they are so flexible.

Below: The Aeroquip Hose Lines on this foot-operated air clutch have been in service for more than 2½ years.

Each 2500-ton Maxipres at LeFere Forge and Machine Company, Jackson, Michigan, turns out 6000 forgings every eight hours. Full schedules leave no room for untried, unproved maintenance items.

The Aeroquip Hose Lines used here are punished by vibration, saturated with oil, flexed thousands of times a day. Their durability, under extreme conditions, simplifies maintenance . . . helps keep equipment working. In fact, much of the downtime formerly experienced was eliminated when Aeroquip Hose Lines were installed.

Find out how you, too, can gain by standardizing on Aeroquip Hose and Reusable Fittings. Write for Bulletin 159, or see your Aeroquip distributor. He's listed in the Yellow Pages of your Telephone Directory.

Aeroquip

REG. TRADEMARK

AEROQUIP CORPORATION, JACKSON, MICHIGAN

IN CANADA: AEROQUIP (CANADA) LTD., TORONTO 15, ONTARIO

LOCAL REPRESENTATIVES IN PRINCIPAL CITIES IN U.S.A. AND ABROAD • AEROQUIP PRODUCTS ARE FULLY PROTECTED BY PATENTS IN U.S.A. AND ABROAD

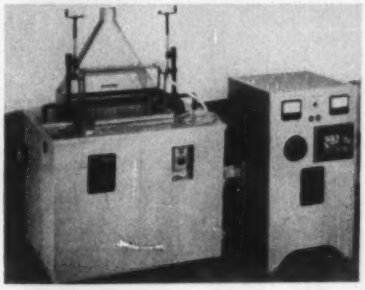
ules plug into a specially designed power channel. Studs lock the units into a compact, nearly solid assembly.

A logic diagram is printed on the module, and each terminal is numbered. An external color dot indicates how the unit should be positioned; reversing the module reverses its phase relationship.

The new modules are expected to replace the original Cypak system that has been applied to the control of such units as automatic lathes, honing machines, presses, precision boring machines, engine block transfer machines and automatic assembly machines. *Write*: Westinghouse Electric Corp., 401 Liberty Ave., Box 2278, Pittsburgh 30, Pa. *Phone*: Express 1-2800

Chrome Plating

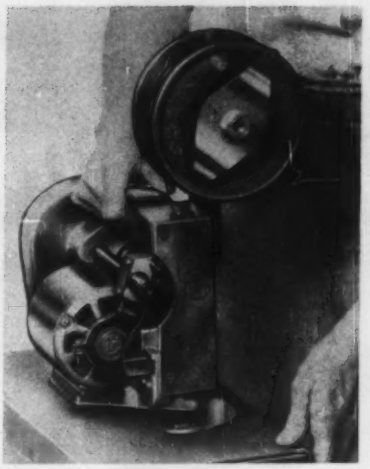
The Chromplater Model 300 has a tank 15 x 20 x 30 in. Two 3000-watt, electric, immersion heaters and a heavy gage steel water jacket control bath temperature through an adjustable thermostat.



The rectifier provides a 300-amp, direct-current output to the plating bath and operates on 3-phase alternating current at 200 volts. *Write*: Dawson Corp., 302 Fifth Ave., North Pelham, N. Y.

Wire Stitcher

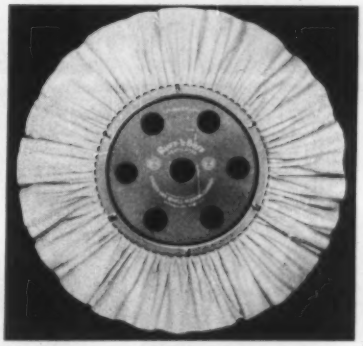
A new, 15-lb wire stitcher, easily carried to any plant location, performs every conventional task done by pedestal stitchers. A standard 5-lb spool of 0.103 x 0.020 (or finer) ribbon wire, readily attached to the machine, supplies wire to form stitches at lower cost than conventional staples or tape. The unit makes about 200



stitches a minute on single or double fluted board, as well as fibre, wood or leather. Optional equipment includes special arms for specific jobs, such as odd-shaped cartons, and an open head for closing cartons. It can be adapted to tacking with 0.020 x 0.030 wire or wire of other dimensions. *Write:* Ordnance Gauge Co., Philadelphia, Pa. *Phone*: Garfield 3-0800

Buffing Wheels

New steel centers enable these metal finishing wheels to dissipate frictional heat fast enough to keep the buff cool under all practical operating conditions. The new center, composed of two steel discs, also provides stronger support than the fiberboard centers formerly used. The central section of the buff is sewed together just past the steel area, providing an additional safety feature.



Ruff-L-Buffs, available in a wide range of sizes, are used for cutting down all metals. The bias cloth and ruffle construction provide fast cutting, long wear life, low compound consumption, cool running and fewer sections per buff wheel. Buffs are Binderized, impregnated with the same compound used for cutting or untreated. *Write*: Hanson-Van Winkle-Munning Co., Church St., Matawan, N. J. *Phone*: Matawan 1-1000

Fork Truck

Model B-224, a highly maneuverable, 2000-lb-capacity unit, features powered directional controls mounted on the steering column within easy reach of the operator. Teamed with an automatic transmission, the handy control lever lets an operator make smooth starts or reverse direction without clutching, gear shifting or removing either hand from the wheel.

The truck has an exclusive hydraulic equalizing rear suspension system which automatically cross-compensates for floor variations up to 3 in., double-frame construction and independent steering wheel suspension.

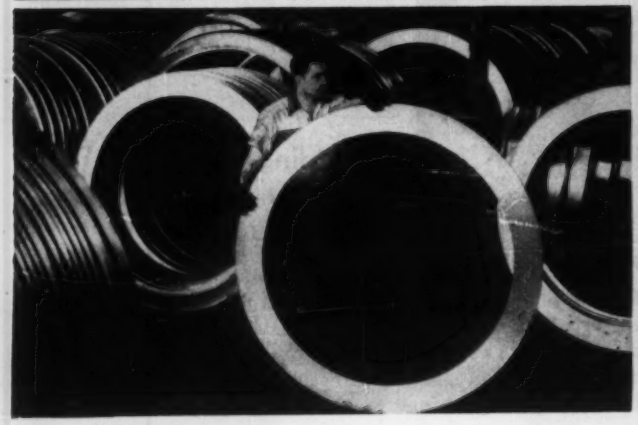
It turns within a 67-in. radius and can make a right-angle turn in an aisle 79¾-in. wide. A 32-hp Hercules engine moves the truck up to 11.5 mph; loaded lift speed is 58 fpm. *Write*: Lamson Mobilift Corp., Syracuse 1, N. Y. *Phone*: 73-0221

Welding Unit

This automatic, consumable-electrode, inert-gas, shielded-arc unit is designed for use with the new, constant-voltage Powromatic welder. It can be mounted on a stationary fixture with the work traveling, or on a traveling fixture with the work stationary.

Two models are available: Model

ALCO Leaded Steel



in ALCO Rolled Forgings and Rings Means...

faster machining...with less power...reduced tool wear

Hi-Qua-Led STEEL

Trade-mark Reg. applied for

ALCO HI-QUA-LED STEEL is five ways better for anyone who removes metal with a tool from rolled forgings and rings.

1 FASTER MACHINING – the presence of lead in ALCO's new Hi-Qua-Led tends to lubricate the cutting action. Whether you're milling, threading or machining on a lathe or boring mill, you get heavier cuts at faster speeds . . . perform fewer cutting operations.

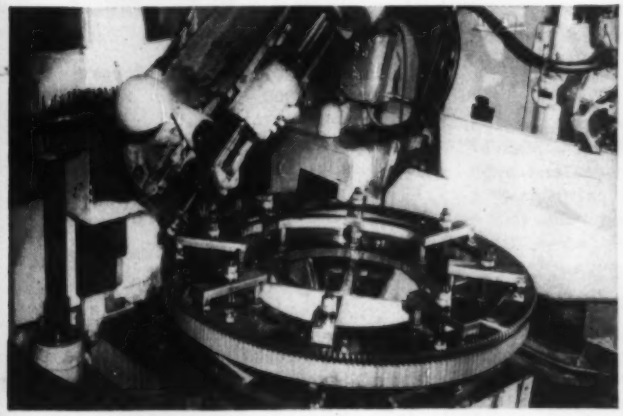
2 LONGER TOOL LIFE – Hi-Qua-Led's special properties minimize frictional heat. Tools operate at lower temperature – so they last longer. You save on replacement and re-dressing costs. If you wish, lower grade tools may be used.

3 IMPROVED SURFACE FINISH – Hi-Qua-Led's clean cutting characteristic produces a fine surface – so smooth, by the way, that in some cases a roughing tool can be used to obtain the desired finish.

4 LESS POWER NEEDED – with Hi-Qua-Led you need much less power on your machine tools. Motors can be operated at lower horsepower. The cutting tool moves easily through the work even on heavy cuts with much less effort than on ordinary steels.

5 EXCELLENT PHYSICAL PROPERTIES – tensile strength, ductility, impact strength and notch resistance are the same in tested leaded and unleaded samples of the same heat.

You can test ALCO Hi-Qua-Led Steel and see its advantages in your own shop. We will be glad to make up part of an order for circular forgings using steel to your specifications and the balance with Hi-Qua-Led Steel. Ask your nearest ALCO representative or write P. O. Box 1065, Schenectady 1, New York.



ALCO

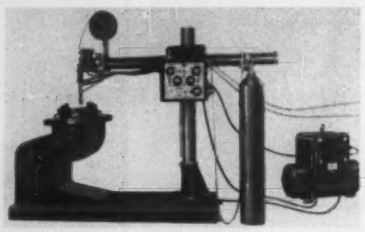
ALCO PRODUCTS, INC.

New York

Sales Offices in Principal Cities

NEW PRODUCTS and equipment

AIG-4D is a dual control type with a double-swing welding head, gas and water supply facilities, dual control panel, wire reel and spool adapter. Model AIG-4T is a triple control type which has the same components as the Model AIG-4D, plus an additional travel motor speed control in the control panel.



The shielding gas may be argon, helium or carbon dioxide. By using different sizes of wire-feed rolls and guides, and different gearbox ratios, it is possible to use either model with hard wires 0.035 to 1/8-in., or soft wires 0.045 to 3/32-in. *Write*: Hobart Bros. Co., Hobart Square, Troy, O. *Phone*: 2-1223

Air Grinder

A new air motor gives this grinder 50 per cent more power than similar tools in its 7-lb weight class. Speeds of 4500, 6000 and 8000 rpm are available.

An adjustable, positive speed governor increases air economy and assures safety under operating conditions. A built-in exhaust muffler reduces noise levels.

Grip handles are spaced 110 degrees apart to increase the worker's convenience and efficiency. *Write*: Thor Power Tool Co., Aurora, Ill. *Phone*: Aurora 2-7601

NEW literature

Write directly to the company for a copy

Low-Lift Trucks

Model M rider-type trucks (in capacities up to 4000 lb) plus pallet and platform types are described in a 4-page circular. Lewis-Shepard Products Inc., Department R-16, Watertown, Mass.

Indexing Units

Catalog No. 106 (24 pages) contains full selection and application data on high speed indexing mechanisms. Ferguson Machine & Tool Co., P. O. Box 5841, St. Louis 21, Mo.

Hot Blast Heater

Operating efficiencies of more than 70 per cent are possible with the Whiting-Thermo-Hot Blast heater, which can be adapted to any foundry. It's described in bulletin FY-174, 4 pages. Whiting Corp., 157th St. and Lathrop Ave., Harvey, Ill.

Silicone-Based Paints

Design and maintenance advantages of silicone-based finishes are detailed in a 4-page brochure. A listing of all paint manufacturers in the U. S. and Canada supplying coatings based on Dow Corning silicones is included. Dow Corning Corp., Midland, Mich.

Quenching Oil Filtration

A 4-page bulletin tells how Delpark Filters keep heat exchangers free of sludge, retain the efficiency of quenching oils and hold constant the high quench quality of parts. Industrial Filtration Co., Department QO-297, Lebanon, Ind.

Stainless Shapes

Hot-rolled stainless steel shapes save time, reduce material waste and machining costs—4-page folder. A 6-page folder covers tool steel, standard carbon and alloy steels and special shapes. Henry Disston & Sons Inc., Steel Sales Division, Philadelphia 35, Pa.

Impact Extrusion Process

"Alcoa Impacts—Design Manual" discusses new techniques and applications of the impact extrusion process—32 pages. Aluminum Co. of America, Room 776, Alcoa Bldg., Pittsburgh 19, Pa.

Oxide Cutting Tool

Bulletin 156 (4 pages) lists the physical and mechanical properties of Stupalox, a new high-strength oxide cutting tool, and gives data on a series of machining trials. Stupakoff Division, Carborundum Co., Latrobe, Pa.

Cutting Tools

Bulletin GTO-102 describes cemented oxide 0-30, holders and accessories for machining. Bulletin GT-311 covers specifications for the new, high-titanium, nickel-binder, grade 330 finishing carbide. Carboloy Department, General Electric Co., Detroit 32, Mich.

Germanium Rectifiers

Bulletin 1204 gives general information on industrial uses of germanium rectifiers, including characteristics, construction, advantages, design and application considerations—10 pages. General Electric Co., Schenectady 5, N. Y.

Heaters and Heating Devices

Bulletin GEC-1005G (60 pages) contains an application index, calculating data, specifications and operating information on standard heaters and heating devices. Bulletin GEA-6388 (8 pages) describes a new line of electronic induction heaters. General Electric Co., Schenectady 5, N. Y.

Slip Roll Formers

Bulletin 77 describes a new line of power and hand-operated machines for forming obround and rectangular shapes, and the standard line of slip roll forming machines for cylindrical work—18 pages. Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N. Y.

Stud Welding

Two 4-page application data bulletins (421 and 421.1) list short form specifications and erection procedures for field-assembled insulated metal curtain walls and corrugated metal roofing and siding sheets, installed with the new Setlok fastener. Nelson Stud Welding Division, Gregory Industries Inc., Lorain, O.

Vertical Turbine Pump Motors

Bulletin 1903 describes hollow-shaft motors from 1½ to 400 hp, single phase designs up to 7½-hp and totally enclosed types up to 150 hp—16 pages. U. S. Electrical Motors Inc., Box 2058, Los Angeles 54, Calif.

Electric Industrial Trucks

Specifications on this company's complete line of electrically driven industrial trucks are listed—16 pages. Automatic Transportation Co., 149 W. 87th St., Chicago 20, Ill.

The wet sanding of undercoats on new automobile bodies is a rugged job CARBORUNDUM's Waterproof Papers are designed to do best. Their extremely high rate of cut, resistance to solvents, softness of back, and non-slip properties are features which help to meet the toughest production schedules.

CARBORUNDUM's complete family of Waterproof Papers includes types for every finishing and polishing operation, for surface preparation, and for sanding undercoats and lacquers. They are made in both aluminum oxide and silicon carbide grain, in 9 x 11″ sheets, discs, and cut sheets to fit oscillating machines.

Your CARBORUNDUM Distributor or salesman is ready to demonstrate any of these superior waterproof papers in your finishing department. Call him today. Or write The Carborundum Company, Niagara Falls, New York. In Canada: Canadian Carborundum Company, Ltd., Niagara Falls, Ontario.

Through application "know-how" and product quality

CARBORUNDUM

REGISTERED TRADE MARK

continually puts more sense in your abrasive dollar

US RUBBER **PowerGrip** "Timing®" Belt

"For invention of high order and for particularly meritorious improvements and developments in machines and mechanical processes."

These are The Franklin Institute's words in awarding its 1955 Longstreth Medal to the inventor of U. S. PowerGrip "Timing" Belts—the outstanding contribution to power transmission of the decade.

It's easy to understand why PowerGrip received this great award. By providing near-100% efficiency in positive, non-slip, split-second timing, it has become standard equipment on a wide variety of machines and appliances. The list grows daily.

U. S. PowerGrip Timing Belts—and descriptive literature—are obtainable from factory-trained engineers at any of the 28 strategically located "U. S." District Sales Offices or by contacting us at Rockefeller Center, New York 20, N. Y.

The Franklin Institute, founded in Phila. in 1824, is one of the oldest and most renowned scientific institutions. Its awards are made only after exhaustive studies of contributions to science.

US RUBBER Mechanical Goods Division

United States Rubber

Market Outlook

SOME FORMS of steel will be just as difficult to get in the second half of this year as in the first half.

They include plates, standard structural shapes, wide flange beams, seamless mechanical tubing, line pipe, oil country tubular goods and possibly small sizes of hot-rolled carbon bars.

BOOKED UP— These products (except hot-rolled carbon bars) either are booked on firm orders or will be through the last half. Where producers have not opened books this far, it can be seen that the prospective demand will fill them. Some producers have not opened plate books for all the second half, but new construction under contract and the number of freight cars on order will require large tonnages of structurals and plates through the last half. Some fabricators of structurals and plates will not promise delivery until 1957.

BUILDING DEMAND— Promise of continued heavy activity in the construction field is seen in the volume of contracts awarded in March for future work. The dollar volume was the highest for any March in history.

Although production is whittling down the order backlog of railroad freight cars, there still were 137,070 on the books on Apr. 1.

Prospects for sheared plates next fall are dampened by the probability that one eastern producer will suspend production for a few weeks while making adjustments which will bring in increased capacity later.

STYMIED— No one has had an opportunity to build substantial inventories of structurals, plates and oil country tubular goods. In most instances, consumers of structurals and plates are operating "hand to mouth."

There is more and more talk about steel inventories. How big are they? Where are they?

INCENTIVES—There are three incentives to build inventories: 1. Strong probability of a steel price increase at midyear. 2. Heavy consumption of most forms of steel. 3. Need for steel to carry over a possible steel strike.

Building of steel inventories is spotty. It's centered in the automobile industry, which is stocking up on cold-rolled carbon sheets—steel which became available for inventory because of the decline in auto demand.

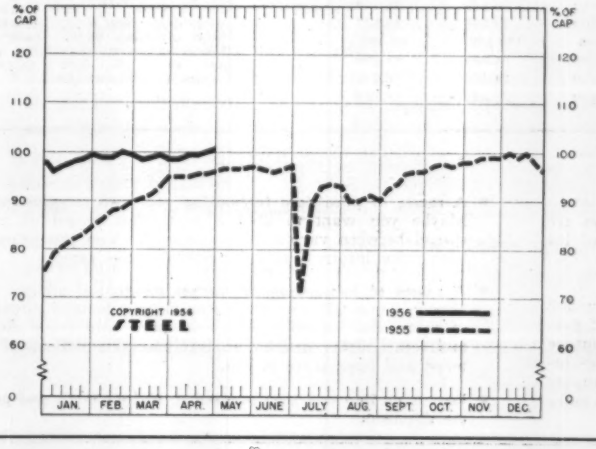
NOTHING TO STORE—Another user of the light, flat-rolled forms of steel—the appliance industry—appears headed for a better year than it had last year. It won't be able to lay away much steel. The same is true of many other consuming groups. Not everybody is getting all of the cold-rolled sheets he wants. The cry for them is particularly insistent from west coast consumers.

Any across-the-board reduction of inventories, such as occurred in late 1953 and in 1954, isn't in the cards.

HIGH PRODUCTION—Demand for steel continues strong, pushing furnaces for all they can produce. In the week ended Apr. 29, production of steel for ingots and castings inched up half a point to 100.5 per cent of capacity.

The scrap market remained strong with STEEL's price composite advancing 33 cents to $55.33 a gross ton. STEEL's price composite on finished steel held at $128.02 a net ton.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Apr. 29	Change	Same Week 1955	Same Week 1954
Pittsburgh	103	— 1.5*	98	70.5
Chicago	100	— 1*	101	78
Mid-Atlantic	99	— 1	96.5	56
Youngstown	97	0	96	70
Wheeling	96.5	— 2	95.5	86
Cleveland	95.5	0	98	77.5
Buffalo	105	0	104.5	67.5
Birmingham	95.5	+ 2.5	93.5	56.5
New England	87	+ 1	90	60
Cincinnati	99	+ 4	92.5	60.5
St. Louis	96.5	+ 1.5	98	72.5
Detroit	97.5	+ 0.5	91	60.5
Western	107	+ 2	92	84
National Rate	100.5	+ 0.5	96	69

INGOT PRODUCTION‡

	Week Ended Apr. 29	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	152.8†	153.5	152.6	143.6
NET TONS (In thousands)	2,454†	2,466	2,452	2,307

*Change from preceding week's revised rate.
†Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,461,893 in 1956; 2,413,278 in 1955; 2,384,549 in 1954.

Metalworking Outlook—p. 53 Technical Outlook—p. 91

Price Indexes and Composites

FINISHED STEEL PRICE INDEX (Bureau of Labor Statistics)

	Apr. 24 1956	Apr. 17 1956	Month Ago	Apr. Average
(1947-1949=100)	157.1	157.1	157.1	157.1

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Apr. 24

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$4.800	Sheets, Electrical	$10.175
Rails, Light, 40 lb	6.217	Strip, C.R., Carbon	8.243
Tie Plates	5.625	Strip, C.R., Stainless, 403 (lb)	0.444
Axles, Railway	8.350	Strip, H.R., Carbon	5.606
Wheels, Freight Car, 33 in. (per wheel)	52.50	Pipe, Black, Buttweld (100 ft)	16.997
Plates, Carbon	5.200	Pipe, Galv., Buttweld (100 ft)	21.137
Structural Shapes	4.867	Pipe, Line (100 ft)	167.250
Bars, Tool Steel, Carbon (lb)	0.460	Casing, Oil Well, Carbon (100 ft)	165.120
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.560	Casing, Oil Well, Alloy (100 ft)	244.670
Bars, Tool Steel, H. R., Alloy, High Speed W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.185	Tubes, Boiler (100 ft)	39.470
Bars, Tool Steel, H.R., Alloy, High Speed W-18, Cr 4, V 1 (lb)	1.680	Tubing, Mechanical, Carbon	21.133
Bars, H.R., Alloy	9.425	Tubing, Mechanical Stainless, 304 (100 ft)	178.897
Bars, H.R., Stainless, 303 (lb)	0.450	Tin plate, Hot-dipped, 1.25 lb	8.933
Bars, H.R., Carbon	5.500	Tin Plate, Electrolytic, 0.25 lb	7.633
Bars, Reinforcing	5.313	Black Plate, Canmaking Quality	6.733
Bars, C.F., Carbon	8.800	Wire, Drawn, Carbon	8.575
Bars, C.F., Alloy	12.275	Wire, Drawn, Stainless 430 (lb)	0.590
Bars, C.F., Stainless, 302 (lb)	0.475	Bale ties (bundle)	6.537
Sheets, H.R., Carbon	5.345	Nails, Wire, 8d Common	8.595
Sheets, C.R., Carbon	6.214	Wire, Barbed (80-rod spool)	7.847
Sheets, Galvanized	7.770	Woven Wire Fence (20-rod roll)	18.635
Sheets, C.R., Stainless 302 (lb)	0.588		

STEEL's FINISHED STEEL PRICE INDEX*

	Apr. 25 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	209.10	209.10	209.10	194.53	171.92
Index in cents per lb	5.665	5.665	5.665	5.270	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT*	$128.02	$128.02	$128.02	$118.45	$106.32
No. 2 Fdry Pig Iron, GT	60.27	60.27	59.55	56.54	52.54
Basic Pig Iron, GT	59.80	59.80	59.05	56.04	52.16
Malleable Pig Iron, GT	61.27	61.27	60.41	57.27	53.27
Steelmaking Scrap, GT	55.33	55.00	53.50	36.00	44.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	Apr. 25 1956	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	4.65	4.65	4.65	4.30	3.70
Bars, H.R., Chicago	4.65	4.65	4.65	4.30	3.70
Bars, H.R., deld. Philadelphia	4.93	4.93	4.93	4.55	4.20
Bars, C.F., Pittsburgh	6.25*	6.25*	6.25*	5.40	4.55
Shapes, Std., Pittsburgh	4.60	4.60	4.60	4.25	3.65
Shapes, Std., Chicago	4.60	4.60	4.60	4.25	3.65
Shapes, deld., Philadelphia	5.00	5.00	5.00	4.53	3.91
Plates, Pittsburgh	4.50	4.50	4.50	4.225	3.70
Plates, Chicago	4.50	4.50	4.50	4.225	3.70
Plates, Coatesville, Pa.	4.80	4.80	4.80	4.225	4.15
Plates, Sparrows Point, Md.	4.50	4.50	4.50	4.225	3.70
Plates, Claymont, Del.	4.80	4.80	4.80	4.225	4.15
Sheets, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.60-3.75
Sheets, H.R., Chicago	4.325	4.325	4.325	4.05	3.60
Sheets, C.R., Pittsburgh	5.325	5.325	5.325	4.95	4.35
Sheets, C.R., Chicago	5.325	5.325	5.325	4.95	4.35
Sheets, C.R., Detroit	5.325-5.425	5.325-5.425	5.325-5.425	5.10	4.55
Sheets, Galv., Pittsburgh	5.85	5.85	5.85	5.45	4.80
Strip, H.R., Pittsburgh	4.325	4.325	4.325	4.05	3.75-4.00
Strip, H.R., Chicago	4.325	4.325	4.325	4.05	3.50
Strip, C.R., Pittsburgh	6.25	6.25	6.25	5.75	4.65-5.35
Strip, C.R., Chicago	6.25-6.35	6.25-6.35	6.25-6.35	5.85	4.90
Strip, C.R., Detroit	6.35	6.35	6.35	5.90	4.35-5.60
Wire, Basic, Pittsburgh	6.60	6.60	6.60	5.75	4.85-5.10
Nails, Wire, Pittsburgh	7.60	7.60	7.60	6.85	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.45	$9.45	$9.45	$9.05	$8.70

*Including 0.35c for special quality

SEMIFINISHED STEEL					
Billets, Forging, Pitts. (NT)	$84.50	$84.50	$84.50	$78.00	$66.00
Wire rods, 7/32-9/16" Pitts.	5.375	5.375	5.375	4.675	4.10-4.30

PIG IRON, Gross Ton					
Bessemer, Pitts.	$61.00	$61.00	$59.50	$57.00	$53.00
Basic Valley	60.00	60.00	58.50	56.00	52.00
Basic, deld. Phila.	63.76	63.76	63.76	59.66	56.49
No. 2 Fdry, Pitts.	60.50	60.50	60.50	56.50	52.50
No. 2 Fdry, Chicago	60.50	60.50	60.50	56.50	52.50
No. 2 Fdry, deld. Phila.	64.26	64.26	64.26	55.16	56.99
No. 2 Fdry, Birm.	55.00	55.00	55.00	52.88	48.88
No. 2 Fdry (Birm.) deld. Cin.	62.70	62.70	62.70	60.58	55.33
Malleable, Valley	60.50	60.50	59.00	56.50	52.50
Malleable, Chicago	60.50	60.50	60.50	56.50	52.50
Ferromanganese, Duquesne	215.00†	215.00†	205.00†	190.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pitts.	$55.50	$54.50	$53.50	$35.50	$45.00
No. 1 Heavy Melt, E. Pa.	56.00	56.00	53.50	37.50	43.50
No. 1 Heavy Melt, Chicago	54.50	54.50	53.50	35.00	43.50
No. 1 Heavy Melt, Valley	59.50	60.50	57.50	35.50	45.00
No. 1 Heavy Melt, Cleve.	56.50	57.50	54.50	33.50	44.00
No. 1 Heavy Melt, Buffalo	55.50	55.50	50.50	32.50	44.00
Rails, Rerolling, Chicago	72.50	72.50	72.50	52.50	52.50
No. 1 Cast, Chicago	52.50	51.50	48.50	40.50	49.00

COKE, Net Ton					
Beehive, Furn, Connlsvl.	$14.125	$14.125	$14.125	$13.75	$14.75
Beehive, Fdry, Connlsvl.	16.50	16.50	16.50	16.75	17.50
Oven, Fdry, Chicago	27.00	27.00	27.00	24.50	21.00

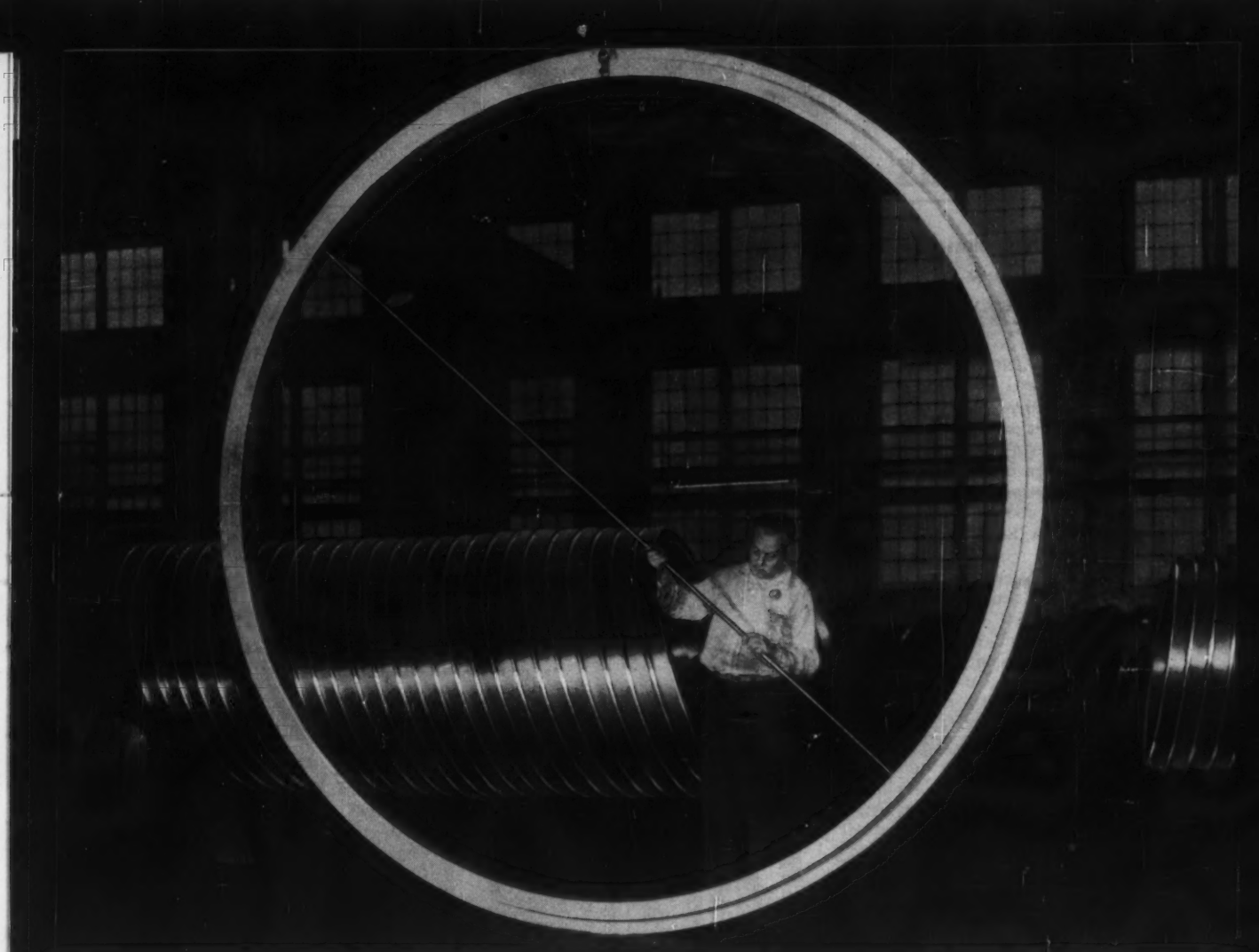
Daily Nonferrous Price Record

	Price Apr. 25	Last Change	Previous Price	Mar. Avg.	Feb. Avg.	Apr. 1955 Avg.
Copper	46.00-47.50	Apr. 23, 1956	46.00-48.00	49.727	48.076	36.000
Lead	15.80	Jan. 13, 1956	16.30	15.800	15.800	14.800
Zinc	13.50	Jan. 6, 1956	13.00	13.500	13.500	11.927
Tin	98.75	Apr. 24, 1956	99.00	100.606	100.908	91.458
Nickel	64.50	Nov. 24, 1954	60.00	64.500	64.500	64.500
Aluminum	25.90	Mar. 29, 1956	24.40-25.90	24.650	24.400	23.200
Magnesium	32.50	Aug. 16, 1955	28.50	32.500	32.500	28.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Freeport, Tex.

What You Can Use the Markets Section for:

- **A source of price information.** Current prices are reported each week. Price changes are shown in italics. Price trends are shown in tables of indexes and comparisons.
- **A directory of producing points.** Want to know who makes something, or where it is made? The steel price tables alphabetically list the cities of production and indicate the producing company. If you are a buyer, you may want to make a map showing comparative distances of sources of supply and to help you compute freight costs. If you are a seller of supplies you can make a map to spot your sales possibilities.
- **A source of price data for making your own comparisons.** Maybe you want to keep a continuous record of price spread between various forms of steel. You can get your base price information from STEEL's price tables.
- **A source of information on market trends.** Newsy items tell you about the supply-demand situation of materials, including iron and steel, nonferrous metals and scrap. Other articles analyze special situations of interest and importance to you.
- **Reports on iron and steel production, and materials and product shipments.**



you can improve your product, cut costs with Standard Steel forged rings and flanges

Here's why you can be sure of a *quality* product when you specify Standard Steel rings and flanges:

- We produce our own acid open hearth steel, quality-controlling it every step of the way.
- Our rolling practice reflects 60 years of experience. Controlled cooling and subsequent heat treatment assure long service life.
- Finished rings and flanges are carefully inspected to make certain they meet your specifications exactly.

When you specify Standard Steel rings and flanges you cut costs because:

- First costs are often lower.
- Final costs are invariably lower. Pieces are rolled close to final tolerances, so expensive machining time is greatly reduced.
- We offer extra services—rough machining, finish machining, drilling, splitting, parting—that often cost less in our shop than elsewhere.
- You get fast service—no costly delays to your production schedule.

In addition to rings and flanges, Standard Steel Works can furnish you with shafts, wheels, gear blanks and special shapes. Next time you need forgings of any kind, get our quotation first. For your copy of our new bulletin, write Dept. 8546, Standard Steel Works Division, BLH Corporation, Burnham, Pa.

BALDWIN BLH LIMA-HAMILTON

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Nonferrous Metals

Industry spokesmen warn that lead and zinc producers must develop new markets. Imports and rising production costs are viewed with alarm by miners

LEAD AND ZINC men are pretty well assured of a market for all the metal they can produce for the next year or so, but over the longer term, they will have to hustle up some new uses. That was the consensus at the combined meetings of the American Zinc Institute and the Lead Industries Association at St. Louis last week (Apr. 23-25).

Speakers — Jean Vuillequez, vice president, the American Metal Co. Ltd., reported: "I do not feel that world lead and zinc requirements need suffer a reduction in use due to the current domestic level of automobile production."

Reasons: 1. This year's models are using more zinc diecastings per car than ever before. 2. The consumption of lead is geared to the number of cars on the road (battery needs; gasoline containing tetraethyl lead) rather than annual car production.

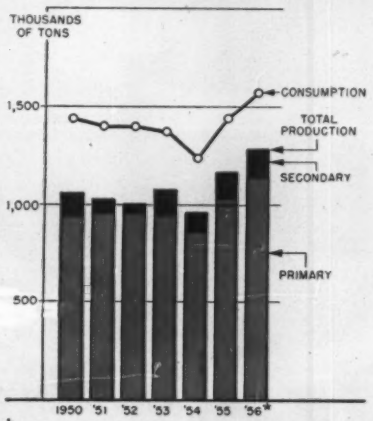
While Mr. Vuillequez sees both supply and demand for lead and zinc continuing at the high levels set in 1955, he warns: "In the next ten years an increase of from 20 to 25 per cent in the free world's use of lead is necessary. Zinc must find additional markets so as to increase its use by at least 35 per cent if consumption is to keep up with potential production."

Miners Worried—Speaking on the mining aspects of lead and zinc, M. P. Romney, manager, Utah Mining Association, said: Lead-zinc mining in this country is suffering from the imports of these metals; from the approaching end of U. S. stockpile programs and from the increasing deficit in mine operating income caused by rising production costs.

We need to develop more fundamental data on both lead and zinc and their alloys, explains A. J. Phillips, vice president and director of research, American Smelting & Refining Co. He reports that new fields for both metals may be found through more basic information on lead as a superconductor; possible developments of new lead and zinc organic compounds; investigation of the potentialities inherent in the high vapor pressure of zinc; and expanding possibilities for the use of lead for radiation shielding in atomic energy plants.

Outlook: Lead and zinc producers are not worried about 1956. Government observers attending the meetings helped keep this confidence high by indicating that the General Services Administration will continue to enter the market to buy up any excess production for U.S. stockpile. An attempt may be made to place some kind of a tax on lead and zinc imports, too.

Production and Consumption Of Copper in the U.S.†



†Production, Copper Institute; Consumption, U.S. Copper Ass'n.
*Estimated, STEEL

Spring Thaw in Canada

Aluminium Ltd.'s Quebec smelters are resuming full production. Abnormally low stream flow during the third and fourth quarters of last year caused production cutbacks. The spring thaw is now under way in the northern watershed and is replenishing the reservoirs of the company's hydroelectric system. Company officials point out that a backlog of deferred orders will make it impossible to accept any additional orders for aluminum at this time.

Nickel: New Policy Coming?

Before midyear, the Office of Defense Mobilization may recommend that less emphasis be placed on stockpiling nickel. Attention could center on the development of several American firms as primary producers. National Lead Co., operating the Nicaro project for the government, has proved that commercially acceptable and competitively priced nickel powder and sinter can be produced from Cuban ore fields. Arthur S. Flemming, ODM director, has indicated that some new processes for beneficiating Cuban ores may be just around the corner. If they could produce a greater yield at less cost, companies which have been curious about Cuban ore fields for a long time may become vitally interested if the government shows a willingness to lend a helping hand.

Speculators Plague Copper

The recent fall in copper prices has been attributed to a slack in European demand, Anaconda Co.'s move to allow the Chileans to base their prices on the fluctuating London Metal Exchange, etc. It should be pointed out that copper is still a speculator's commodity. As soon as the market dropped a point or two, a good share of the copper speculators dumped quantities (perhaps 10,000 tons apiece) on the market.

It appears that Anaconda stands out as the "statesman" of the copper industry at the moment. By guessing right and allowing the Chileans to go to the LME quotation, it helped put skyrocketing red metal prices in reverse.

But what will happen if there is a strike? With the first rumor, the speculators will rush into the market —forcing prices up. Meanwhile, users must figure out answers to these questions: 1. Will prices continue to fall? 2. Should inventories be kept high so that orders can be filled if there is a strike? 3. If copper prices continue to fall, when will be the best time to buy?

Market Memos

- What is said to be the largest magnesium die forging ever made is being produced for the five-bladed S-56 helicopter manufactured by Sikorsky Aircraft Division, United Aircraft Corp. It's a five-pointed rotor hub plate which is 4½-ft in diameter. About two-thirds of the rough weight (235 lb) is removed by machining.
- Combined shipments of ingot brass and bronze for March were 28,310 tons, compared with 24,949 tons in February.

Newport Steel

FOR GREEN THUMBS EVERYWHERE

Propagating garden tools and laborsaving equipment constitutes another of the many industries who regularly buy Newport Steel products. By delivering steel in specified qualities and quantities to meet the most discriminating needs of these manufacturers, Newport helps provide dependable service in the finished product. With over seventy years' steelmaking experience, plus modern facilities, strategic location and conscientious personnel, Newport Steel is indeed a most logical source of supply. Look over the list of products below and talk to Newport before you buy.

ECONOMICAL WATERAIL-TRUCK DELIVERY

Newport Steel is ideally situated on the Mississippi-Ohio River system and the great Cincinnati rail-truck hub. New barge facilities, 7 major railroads, and 143 motor carriers enable Newport to give economical, dependable delivery to the entire area of the Middle West and South.

PRODUCTS OF NEWPORT STEEL

- Cold-Rolled Sheets
- Hot-Rolled Steel in Coil
- Hot-Rolled Pickled Steel in Coil
- Hot-Rolled Sheets
- Hot-Rolled Pickled Sheets
- Galvanized Sheets
- Galvannealed Sheets
- Colorbond Sheets
- Electrical Sheets
- Alloy Sheets and Plates
- Electric Weld Line Pipe
- Roofing and Siding
- Eave Trough and Conductor Pipe
- Culverts

Newport Steel

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NEWPORT, KENTUCKY

YOUR CONFIDENCE IS JUSTIFIED WHERE THIS FLAG FLIES

A SUBSIDIARY OF MERRITT-CHAPMAN & SCOTT CORPORATION

Nonferrous Metals

Cents per pound, carlots, except as otherwise noted

PRIMARY METALS AND ALLOYS

Aluminum: 99 + %, ingots, 25.90; pigs, 24.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 12% Si, 27.70; No. 43, 5% Si, 27.50; No. 142, 4% Cu, 1.5% Mg, 2% Ni, 29.70; No. 195, 4.5% Cu, 0.8% Si, 29.10; No. 214, 3.8% Mg, 29.30; No. 356, 7% Si, 0.3% Mg, 27.70.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.00-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, f.o.b. Reading, Pa., Elmore, O.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. Reading, Pa., or Elmore, O.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.60 per lb for 550-lb keg; $2.62 per lb for 100-lb case; $2.67 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 46.00 deld. Conn. Valley; 46.00 deld. Midwest; custom smelter, 47.50 deld.; Lake, 46.00 deld.; Fire refined, 45.75 deld.; Chilean electrolytic, 46.43 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 99 +, cups or ingots, $11.50; rod $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 33.75 f.o.b. Velasco, Tex.; ingot, 34.50 f.o.b. Velasco, Tex.

Magnesium Alloys: AZ91B (diecasting), 35.00 deld.; AZ63A, AZ92A, AZ91C (sand casting), 39.25 f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $268-$271 per 76-lb flask.

Molybdenum: Powder, 99% hydrogen reduced, $3.20 per lb; pressed ingot, $4.06 per lb; sintered ingot, $5.53 per lb.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 64.50; 10-lb pigs, unpacked, 67.65; "XX" nickel shot, 69.00; "F" nickel shot or ingots for addition to cast iron, 64.50; prices f.o.b. Fort Colborne, Ont., including import duty. New York basis, add 0.92.

Osmium: $80-$100 per troy oz nom.

Palladium: $23-$24 per troy oz.

Platinum: $97-$111 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $13.50-$15.50 per lb.

Silver: Open market, 90.75 per troy oz.

Sodium: 16.50, c.l.; 17.00 l.c.l

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.50-$1.75 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N. Y., spot, 98.75; prompt, 98.50.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $3.45; grade A-2 (0.5% Fe max), $3.15 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.50 per lb, nom, f.o.b. shipping point; less than 1000 lb add 15.00; 99 +% hydrogen reduced, $5.00. Treated ingot, $6.70.

Zinc: Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. High grade, 14.85; special high grade, 15.25 deld.

Diecasting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50, deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $7.50-$10.00 per lb, depending on quantity; reactor grade, $14.00-$22.00 per lb, depending on quantity. Powder, electronics grade, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 29.25-31.75; No. 12 foundry alloy (No. 2 grade), 27.75-28.50; 5% silicon alloy, 0.60 Cu max, 29.75-30.00; 13 alloy, 0.60 Cu max, 29.75-30.00; 195 alloy, 30.00; 108 alloy, 28.25. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 28.25-29.25; grade 2, 27.50-28.50; grade 3, 26.75-27.75; grade 4, 26.00-27.00.

Brass Ingot: Red brass, No. 115, 42.00; tin bronze, No. 225, 55.75; No. 245, 48.75; high-leaded tin bronze, No. 305, 45.75; No. 1 yellow, No. 405, 33.25; manganese bronze, No. 421, 37.75.

Magnesium Alloy Ingot: AZ63A, 36.00; AZ91B, 36.00; AZ91C, 36.00; AZ92A, 36.00.

NONFERROUS MILL PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb, f.o.b. Temple, Pa.; nominal 1.9% Be alloy) Strip, $1.92; rod, bar, wire, $1.89.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 51.355; l.c.l., 51.98. Weatherproof, 30,000-lb lots, 48.28; l.c.l., 49.03. Magnet wire deld., 15,000 lb or more, 58.68; l.c.l., 59.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill) Sheets, $13.10-$13.60; sheared mill plate, $10.50-$12.00; strip, $13.10-$13.60; wire, $9.50-$11.50; forging billets, $7.90-$8.15; hot-rolled and forged bars, $7.90-$8.15.

ZINC

(Prices per lb, c.l., f.o.b. mill) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $22; H.R. strip, $19; C.R. strip, $29; forged or H.R. bars, $17; wire, 0.015 in., 1.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	102	83	99
Strip, C.R.	102	92	125
Plate, H.R.	97	87	95
Rod, Shapes, H.R.	87	74	93
Seamless Tubes	122	110	153

ALUMINUM

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	69.4	67.9	...	...
0.156-0.172	59.0	57.4	...	...
0.188	59.0	57.4	...	73.2
0.219-0.234	56.0	54.4	...	...
0.250-0.281	56.0	54.4	...	69.9
0.313	56.0	54.4	...	66.7
Cold-finished				
0.375-0.547	54.9	52.9	65.2	62.8
0.563-0.688	54.9	52.9	62.1	59.0
0.750-1.000	53.6	51.6	56.9	55.7
1.063	53.6	51.6	...	53.8
1.125-1.500	51.6	49.7	55.1	53.8
Rolled				
1.563	50.3	48.4	...	...
1.625-2.000	49.7	47.7	...	52.0
2.125-2.500	48.5	46.5	...	...
2.563-3.375	47.1	45.1	...	...

ALUMINUM

Sheet and Circle: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range Inches	Flat Sheet	Flat Sheet Circles*	Coiled Sheet	Coiled Sheet Circles†
0.249-0.136	39.0	43.8	...	...
0.135-0.096	39.5	44.7	37.5	42.4
0.095-0.077	40.2	45.7	37.6	42.8
0.076-0.061	40.8	46.6	37.8	43.0
0.060-0.048	41.4	47.1	38.2	43.5
0.047-0.038	41.9	48.0	38.7	43.9
0.037-0.030	42.3	48.5	39.1	44.6
0.029-0.024	42.9	49.0	39.4	45.1
0.023-0.019	43.7	50.5	40.3	46.0
0.018-0.017	44.5	...	40.9	46.9
0.016-0.015	45.4	...	41.7	48.1
0.014	46.4	...	42.7	49.4
0.013-0.012	47.6	...	43.4	50.4
0.011	48.6	...	44.6	52.0
0.010-0.0095	49.9	...	45.8	53.7
0.009-0.0085	51.2	...	47.3	55.8
0.008-0.0075	52.8	...	48.5	57.6
0.007	54.3	...	50.0	59.9
0.006	55.9	...	51.4	64.9

*48 in. max diam. †26 in. max diam.

ALUMINUM

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam, 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	38.0	42.3
5050-F	39.1	43.4
3004-F	40.1	45.3
5052-F	41.4	46.7
6061-T6	42.6	47.5
2024-T4*	45.1	51.4
7075-T6*	52.9	60.0

*24-48 in. widths or diam, 72-180 lengths.

ALUMINUM

Forging Stock: Round, Class 1, 40.60-51.60 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 44.50-57.70 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, 20-ft length, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$17.45	2	$ 53.85
1	27.35	4	148.60
1¼	37.05	6	266.55
1½	44.30	8	401.10

MAGNESIUM

Sheet and Plate: AZ31A standard grade, .032 in., 100.00; .081 in., 75.00; .188 in., 66.50; .250-2.0 in., 65.60. AZ31A special grade, .032 in., 163.10; .081 in., 103.50; .188 in., 91.10; .250-2.0, 88.90. Tread plate, .188 in., 68.90; .250-2.0 in., 67.80. Tooling plate, .250-3.0 in., 70.20.

Extruded Solid Shapes:

Factor	Com. Grade (FS)	Spec. Grade (AZ31B)
6-8	66.40-69.00	81.40-84.00
12-14	67.50-69.60	82.50-84.60
24-26	72.10-72.70	87.10-87.70
36-38	84.90-85.80	99.90-100.80

NONFERROUS SCRAP

DEALERS BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 19.00; old sheets, 16.50-17.00; borings and turnings, 10.50-11.00; crankcases, 17.50-18.00; industrial castings, 16.00-16.50.

Copper and Brass: No. 1 heavy copper and wire, 37.50-38.00; No. 2 heavy copper and wire, 35.50-36.00; light copper, 33.00-33.50; No. 1 composition red brass, 29.50-30.00; No. 1 composition turnings, 28.50-29.00; yellow brass

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	68.63b	65.86c	....	68.82	43.500	43.500	42.750
Yellow Brass	56.60	46.58d	57.14	59.51	32.250	32.000	29.875
Low Brass, 80%	61.35	61.29	61.89	64.16	36.625	36.375	35.875
Red Brass, 85%	63.07	63.01	63.61	65.88	38.250	38.000	37.500
Com. Bronze, 90%	65.33	65.27	65.87	67.89	39.875	39.625	39.125
Manganese Bronze	63.54-63.66	57.52-57.64	67.99	....	30.250	30.000	29.500
Muntz Metal	57.84	53.65	....	....	30.125	29.875	29.375
Naval Brass	59.60-59.80	54.11	66.86	62.96	29.875	29.625	29.125
Silicon Bronze	71.92	71.11	71.96	74.13e	42.250	42.000	41.250
Nickel Silver, 10%	70.17	72.41g	72.41	....	35.625	35.375	17.813
Phos. Bronze, A, 5%	86.79	87.29	87.29	88.47	44.000	43.750	42.750

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. Based on copper at 47.5 cents a pound. g. Leaded

turnings, 18.50-19.50; new brass clippings, 24.50-25.00; light brass, 17.50-18.00; heavy yellow brass, 20.50-21.00; new brass rod ends, 23.50-24.00; auto radiators, unsweated, 22.00-22.50; cocks and faucets, 23.00-23.50; brass pipe, 23.00-23.50.

Lead: Heavy, 12.75-13.00; battery plates, 6.50-6.75; linotype and stereotype, 14.00-14.50; electrotype, 13.25-13.75; mixed babbitt, 15.50.

Magnesium: Clippings, 18.50-19.50; clean castings, 18.00-19.00; iron castings, not over 10% removable Fe, less full deduction for Fe, 16.00-17.00.

Monel: Clippings, 90.00-100.00; old sheets, 85.00-95.00 ; turnings, 80.00-85.00; rods, 95.00-100.00.

Nickel: Sheets and clips, 200.00-225.00; rolled anodes, 200.00-225.00; turnings, 180.00-200.00; rod ends, 200.00-225.00.

Zinc: Old zinc, 6.00-6.50; new die-cast scrap, 6.00; old die-cast scrap, 3.50.

REFINER'S BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 21.25-21.50; 3003 clippings, 21.00-21.50; 6151 clippings, 20.75-21.00; 5052 clippings, 20.75-21.00; 2014 clippings, 20.25-21.00; 2017 clippings, 20.50-21.00; 2024 clippings, 20.25-21.00; mixed clippings, 20.50; old sheet, 19.00; old cast, 19.00; clean old cable (free of steel), 20.75-21.50; borings and turnings, 18.50-19.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 68.00; light scrap, 63.00; turnings and borings, 48.00.

Copper and Brass: No. 1 heavy copper and wire, 39.00; No. 2 heavy copper and wire, 37.50; light copper, 35.00; refinery brass (60% copper) per dry copper content, 35.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 38.50; No. 2 heavy copper and wire, 37.00; light copper, 34.50; No. 1 composition borings, 31.00; No. 1 composition solids, 31.50; heavy yellow brass solids, 22.00; yellow brass turnings, 21.50; radiators, 24.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 65.29; oval, 64.42, 5000-10,000 lb; electrodeposited, 61.25, 2000-5000 lb lots; cast 60.54, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb. All prices eastern delivery, effective Jan. 1, 1955.

Tin: Bar or slab, less than 200 lb, $1.175; 200-499 lb, $1.160; 500-999 lb, $1.155; 1000 lb or more, $1.150.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $2.15 per lb, in 100-lb drums.

Chromic Acid: Less than 10,000 lb, 28.50; over 10,000 lb, 27.50.

Copper Cyanide: 100 lb, 85.25; 200 lb, 84.50; 300 lb, 84.25; 400-900 lb, 83.50; 1000 lb, 81.50.

Copper Cyanide: 100 lb 85.25; 200 lb, 84.50; lb, 15.90; 6000 lb or more, 15.65.

Nickel Chloride: 100 lb, 46.50; 200 lb, 44.50; 300 lb, 43.50; 400-4900 lb, 41.50; 5000-9900 lb, 39.50; 10,000 lb and over, 38.50. All prices eastern delivery, effective Jan. 1, 1955.

Nickel Sulphate: 100 lb, 38.25; 200 lb, 36.25; 300 lb, 35.25; 400-4900 lb, 33.25; 5000-35,900 lb, 31.25; 36,000 lb, 30.35. All prices eastern delivery, effective Jan. 1, 1955.

Silver Cyanide: (Cents per ounce) 4-oz bottle, 86.875; 15-oz bottle, 85.625; 80-oz bottle, 83.125; 100-oz bottle, 83.125; f.o.b. St. Louis, New York and Los Angeles. Effective Sept. 30, 1955.

Sodium Cyanide: Egg, under 1000 lb, 19.80; 1000-19,900 lb, 18.80; 20,000 lb, and over, 17.80; granular, add 1-cent premium to above.

Sodium Stannate: Less than 100 lb, 70.90; 100-600 lb, 62.50; 700-1900 lb, 60.00; 2000-9900 lb, 58.30; 10,000 lb or more, 57.10.

Stannous Chloride (anhydrous): Less than 25 lb, $1.677; 25 lb, $1.327; 100 lb, $1.177; 400 lb, $1.153; 5200-19,600 lb, $1.031; 20,000 lb, 90.90.

Stannous Sulphate: Less than 50 lb, $1.304; 50 lb, $1.004; 100-1900 lb, 98.40; 2000 lb or more, 96.40.

Zinc Cyanide: Under 1000 lb, 54.30; 1000 lb and over, 52.30.

Sometimes a metal isn't quite as tough as the job it's asked to do. Setting things straight (before the metal runs into trouble) is a job for metal specialists. Riverside metallurgists are specialists. We think you'll like their skill, their experience and their equipment.

THE RIVERSIDE METAL COMPANY DIVISION
H. K. PORTER COMPANY, INC.
Riverside, New Jersey

RIVERSIDE HKP

Philadelphia • East Orange, N. J. • Rochester, N. Y.
Hartford • Cleveland • Chicago • Detroit

PHOSPHOR BRONZE AND NICKEL SILVER SHEET, STRIP, WIRE AND ROD

Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 143; to footnotes, page 145.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5	$65.50

INGOTS, Alloy (NT)

Detroit R7	$69.00
Houston S5	74.00
Midland,Pa. C18	69.00
Munhall,Pa. U5	69.00

BILLETS, BLOOMS & SLABS

Carbon, Rerolling (NT)

Aliquippa,Pa. J5	$68.50
Bessemer,Pa. U5	68.50
Bridgeport,Conn. N19	73.50
Buffalo R2	68.50
Clairton,Pa. U5	68.50
Ensley,Ala. T2	68.50
Fairfield,Ala. T2	68.50
Fontana,Calif. K1	78.00
Gary,Ind. U5	68.50
Johnstown,Pa. B2	68.50
Lackawanna,N.Y. B2	68.50
LoneStar,Tex. L6	74.50
Munhall,Pa. U5	68.50
Pittsburgh J5	68.50
S.Chicago,Ill. R2, U5	68.50
S.Duquesne,Pa. U5	68.50
Youngstown R2	68.50

Carbon, Forging (NT)

Aliquippa,Pa. J5	$84.50
Bessemer,Pa. U5	84.50
Bridgeport,Conn. N19	89.50
Buffalo R2	84.50
Canton,O. R2	86.50
Clairton,Pa. U5	84.50
Conshohocken,Pa. A3	89.50
Ensley,Ala. T2	84.50
Fairfield,Ala. T2	84.50
Fontana,Calif. K1	94.00
Gary,Ind. U5	84.50
Geneva,Utah C11	84.50
Houston S5	101.00
Johnstown,Pa. B2	84.50
Lackawanna, N.Y. B2	84.50
LosAngeles B3	94.00
Midland,Pa. C18	84.50
Munhall,Pa. U5	84.50
Pittsburgh J5	84.50
Seattle B3	98.00
S.Chicago R2,U5,W14	84.50
S.Duquesne,Pa. U5	84.50
S.SanFrancisco B3	94.00

Alloy, Forging (NT)

Bethlehem,Pa. B2	$96.00
Buffalo R2	96.00
Canton,O. R2, T7	96.00
Conshohocken,Pa. A3	103.00
Detroit R7	96.00
Fontana,Calif. K1	117.00
Gary,Ind. U5	96.00
Houston S5	105.00
Ind.Harbor,Ind. Y1	96.00
Johnstown,Pa. B2	96.00
Lackawanna,N.Y. B2	96.00
LosAngeles B3	116.00
Massillon,O. R2	96.00
Midland,Pa. C18	96.00
Munhall,Pa. U5	96.00
S.Chicago R2,U5,W14	96.00
S.Duquesne,Pa. U5	96.00
Struthers,O. Y1	96.00
Warren,O. C17	96.00

ROUNDS, SEAMLESS TUBE (NT)

Buffalo R2	$103.50
Canton,O. R2	103.50
Cleveland R2	103.50
Gary,Ind. U5	103.50
S.Chicago R2, W14	103.50
S.Duquesne,Pa. U5	103.50

SKELP

Aliquippa,Pa. J5	4.325
LoneStar,Tex. L6	4.625
Munhall,Pa. U5	4.225
SparrowsPoint,Md. B2	4.225
Warren,O. R2	4.225
Youngstown R2, U5	4.225

WIRE RODS

AlabamaCity,Ala. R2	5.375
Aliquippa,Pa. J5	5.375
Alton,Ill. L1	5.55
Buffalo W12	5.375
Cleveland A7	5.375
Donora,Pa. A7	5.375
Fairfield,Ala. T2	5.375
Houston S5	5.625
IndianaHarbor,Ind. Y1	5.375
Johnstown,Pa. B2	5.375
Joliet,Ill. A7	5.375
KansasCity,Mo. S5	5.625
Kokomo,Ind. C16	5.475
Los Angeles B3	6.175
Minnequa,Colo. C10	5.625
Monessen,Pa. P7	5.375
N.Tonawanda,N.Y. B11	5.375
Pittsburg,Calif. C11	6.025
Portsmouth,O. P12	5.375
Roebling,N.J. R5	5.475
S.Chicago,Ill. R2	5.375
SparrowsPoint,Md. B2	5.475
Sterling,Ill.(1) N15	5.375
Sterling,Ill. N15	5.475
Struthers,O. Y1	5.375
Worcester,Mass. A7	5.675

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2	4.60
Aliquippa,Pa. J5	4.60
Bessemer,Ala. T2	4.60
Bethlehem,Pa. B2	4.65
Birmingham C15	5.10
Clairton,Pa. U5	4.60
Fairfield,Ala. T2	4.60
Fontana,Calif. K1	5.30
Gary,Ind. U5	4.60
Geneva,Utah C11	4.60
Houston S5	4.70
Ind.Harbor,Ind. I-2	4.60
Johnstown,Pa. B2	4.65
KansasCity,Mo. S5	4.70
Lackawanna,N.Y. B2	4.65
LosAngeles B3	5.30
Minnequa,Colo. C10	4.90
Munhall,Pa. U5	4.60
Niles,Calif. P1	5.25
Phoenixville,Pa. P4	5.15
Portland,Oreg. O4	5.35
Seattle B3	5.35
S. Chicago U5, W14	4.60
S.SanFrancisco B3	5.25
Torrance,Calif. C11	5.30
Weirton,W.Va. W6	4.60

Wide Flange

Bethlehem,Pa. B2	4.65
Clairton,Pa. U5	4.60
Fontana,Calif. K1	5.45
Lackawanna,N. Y. B2	4.65
Munhall,Pa. U5	4.60
Phoenixville,Pa. P4	5.15
S.Chicago,Ill. U5	4.60

Alloy Std. Shapes

Clairton,Pa. U5	5.65
Fontana,Calif. K1	7.40
Gary,Ind. U5	5.65
Houston S5	5.75
Munhall,Pa. U5	5.65
S.Chicago,Ill. U5	5.65

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5	6.75
Bessemer,Ala. T2	6.75
Bethlehem,Pa. B2	6.80
Clairton,Pa. U5	6.75
Fairfield,Ala. T2	6.75
Fontana,Calif. K1	7.45
Gary,Ind. U5	6.75
Geneva,Utah C11	6.75
Houston S5	6.85
Ind.Harbor,Ind. I-2, Y1	6.75
Johnstown,Pa. B2	6.80
KansasCity,Mo. S5	6.85
Lackawanna,N.Y. B2	6.80
LosAngeles B3	7.45
Munhall,Pa. U5	6.75
Seattle B3	7.50
S.Chicago,Ill. U5, W14	6.75
S.SanFrancisco B3	7.40
Struthers,O. Y1	6.75

H.S., L.A. Wide Flange

Bethlehem,Pa. B2	6.80
Lackawanna,N.Y. B2	6.80
Munhall,Pa. U5	6.75
S.Chicago,Ill. U5	6.75

PILING

BEARING PILES

Bethlehem,Pa. B2	4.65
Lackawanna,N.Y. B2	4.65
Munhall,Pa. U5	4.60
S.Chicago,Ill. U5	4.60

STEEL SHEET PILING

Ind.Harbor,Ind. I-2	5.45
Lackawanna,N.Y. B2	5.45
Munhall,Pa. U5	5.45
S.Chicago,Ill. U5	5.45

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2	4.50
Aliquippa,Pa. J5	4.50
Ashland,Ky.(15) A10	4.50
Bessemer,Ala. T2	4.50
Bridgeport,Conn. N19	4.75
Buffalo R2	4.50
Clairton,Pa. U5	4.50
Claymont,Del. C22	4.80
Cleveland J5, R2	4.60
Coatesville,Pa. L7	4.80
Conshohocken,Pa. A3	4.50
Detroit M1	4.60
Ecorse,Mich. G5	4.60
Fairfield,Ala. T2	4.50
Fontana,Calif.(30) K1	5.20
Gary,Ind. U5	4.50
Geneva,Utah C11	4.50
GraniteCity,Ill. G4	4.70
Harrisburg,Pa. P4	5.10
Houston S5	4.60
Ind.Harbor, Ind. I-2, Y1	4.50
Johnstown,Pa. B2	4.50
Lackawanna,N.Y. B2	4.50
LoneStar,Tex. L6	4.85
Mansfield,O. E6	4.50
Minnequa,Colo. C10	5.35
Munhall,Pa. U5	4.50
Newport,Ky. N9	4.50
Pittsburgh J5	4.50
Riverdale,Ill. A1	4.725
Seattle B3	5.40
Sharon,Pa. S3	4.50
S.Chicago R2, U5, W14	4.50
SparrowsPoint,Md. B2	4.50
Steubenville,O. W10	4.50
Warren,O. R2	4.50
Weirton,W.Va. W6	4.50
Youngstown R2, U5, Y1	4.50

PLATES, Carbon Abras. Resist.

Claymont,Del. C22	5.65
Fontana,Calif. K1	6.35
Geneva,Utah C11	5.65
Johnstown,Pa. B2	5.65
SparrowsPoint,Md. B2	5.65

PLATES, Wrought Iron

Economy,Pa. B14	10.40

PLATES, High Strength Low-Alloy

Aliquippa,Pa. J5	6.725
Bessemer,Ala. T2	6.725
Clairton,Pa. U5	6.725
Cleveland J5, R2	6.725
Claymont,Del. C22	6.725
Coatesville,Pa. L7	7.025
Conshohocken,Pa. A3	6.725
Ecorse,Mich. G5	6.825
Fairfield,Ala. T2	6.725
Fontana,Calif.(30) K1	7.425
Gary,Ind. U5	6.725
Geneva,Utah C11	6.725
Houston S5	6.825
Ind.Harbor,Ind. I-2, Y1	6.725
Johnstown,Pa. B2	6.725
Munhall,Pa. U5	6.725
Pittsburgh J5	6.725
Seattle B3	7.625
Sharon,Pa. S3	6.725
S.Chicago,Ill. U5, W14	6.725
SparrowsPoint,Md. B2	6.725
Warren,O. R2	6.725
Youngstown U5, Y1	6.725

PLATES, Alloy

Bridgeport,Conn. N19	6.55
Claymont,Del. C22	6.30
Coatesville,Pa. L7	6.30
Fontana,Calif. K1	7.00
Gary,Ind. U5	6.30
Houston S5	6.40
Ind.Harbor,Ind. Y1	6.30
Johnstown,Pa. B2	6.30
Munhall,Pa. U5	6.30
Newport,Ky. N9	6.30
Seattle B3	7.20
Sharon,Pa. S3	6.30
S.Chicago,Ill. U5, W14	6.30
SparrowsPoint,Md. B2	6.30
Youngstown Y1	6.30

FLOOR PLATES

Cleveland J5	5.575
Conshohocken,Pa. A3	5.575
Harrisburg,Pa. P4	5.575
Ind.Harbor,Ind. I-2	5.575
Munhall,Pa. U5	5.575
S.Chicago,Ill U5	5.575

PLATES, Ingot Iron

Ashland c.l. (15) A10	4.75
Ashland,l.c.l. (15) A10	5.25
Cleveland c.l. R2	5.10
Warren,O. c.l. R2	5.10

BARS

BARS, Hot-Rolled Carbon (Commercial Quality)

Ala.City,Ala.(9) R2	4.65
Aliquippa,Pa.(9) J5	4.65
Alton,Ill. L1	4.85
Atlanta A11	4.85
Bessemer,Ala.(9) T2	4.65
Birmingham C15	5.15
Bridgeport,Conn. N19	4.80
Buffalo(9) R2	4.65
Canton,O.(9) R2	4.75
Clairton,Pa.(9) U5	4.65
Cleveland(9) R2	4.65
Ecorse,Mich.(9) G5	4.75
Emeryville,Calif. J7	5.40
Fairfield,Ala.(9) T2	4.65
Fairless,Pa.(9) U5	4.80
Fontana,Calif. K1	5.35
Gary,Ind.(9) U5	4.65
Houston(9) S5	4.90
Ind.Harbor,Ind.(9) I-2	4.65
Ind.Harbor,Ind. Y1	4.65
Johnstown,Pa.(9) B2	4.65
Joliet,Ill. P22	5.15
KansasCity,Mo.(9) S5	4.90
Lackawanna(9) B2	4.65
LosAngeles(9) B3	5.35
Massillon,O.(9) R2	4.75
Midland,Pa.(9) C18	4.65
Milton,Pa. M18	4.80
Minnequa,Colo. C10	5.10
Niles,Calif. P1	5.35
N.T'wanda,N.Y.(9) B11	4.65
Pittsburg,Calif.(9) C11	5.35
Pittsburgh(9) J5	4.65
Portland,Oreg. O4	5.40
Seattle B3 N14	5.40
S.Chicago W14	4.65
S.Chicago,Ill.(9) R2, U5	4.65
S.Duquesne,Pa.(9) U5	4.65
S.SanFran.,Calif.(9) B3	5.40
Sterling,Ill.(1) N15	4.65
Sterling,Ill. N15	4.75
Struthers,O. Y1	4.65
Torrance,Calif.(9) C11	5.35
Warren,O.(9) R2	4.65
Weirton,W.Va.(9) W6	4.65
Youngstown(9) R2, U5	4.65

BARS, H.R. Leaded Alloy

Warren,O. C17	6.575

BARS, Hot-Rolled Alloy

Bethlehem,Pa. B2	5.575
Bridgeport,Conn. N19	5.725
Buffalo R2	5.575
Canton,O. R2, T7	5.575
Clairton,Pa. U5	5.575
Detroit R7	5.575
Ecorse,Mich. G5	5.675
Fairless,Pa. U5	5.725
Fontana,Calif. K1	6.625
Gary,Ind. U5	5.575
Houston S5	5.825
Ind.Harbor,Ind. I-2, Y1	5.575
Johnstown,Pa. B2	5.575
KansasCity,Mo. S5	5.825
Lackawanna,N.Y. B2	5.575
LosAngeles B3	6.625
Massillon,O. R2	5.575
Midland,Pa. C18	5.575
S.Chicago R2, U5, W14	5.575
S.Duquesne,Pa. U5	5.575
Struthers,O. Y1	5.575
Warren,O. C17	5.575
Youngstown U5	5.575

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5	6.80
Bessemer,Ala. T2	6.80
Bethlehem,Pa. B2	6.80
Clairton,Pa. U5	6.80
Cleveland R2	6.80
Ecorse,Mich. G5	6.90
Fairfield,Ala. T2	6.80
Fontana,Calif. K1	7.50
Gary,Ind. U5	6.80
Houston S5	7.05
Ind.Harb.,Ind. I-2, Y1	6.80
Johnstown,Pa. B2	6.80
KansasCity,Mo. S5	7.05
Lackawanna,N.Y. B2	6.80
LosAngeles B3	7.50
Pittsburgh J5	6.80
Seattle B3	7.55
S.Chicago W14	6.80
S.Duquesne,Pa. U5	6.80
S.SanFrancisco B3	7.55
Struthers,O. Y1	6.80
Warren,O. R2	6.80
Youngstown U5	6.80

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2	4.80
Lackawanna(9) B2	4.65

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5	4.65
Atlanta A11	4.85
Fontana,Calif. K1	5.35
Joliet,Ill. P22	5.10
Niles,Calif. P1	5.35
Pittsburgh J5	4.65
Portland,Oreg. O4	5.40
SanFrancisco S7	5.05

BAR SHAPES, Hot-Rolled Alloy

Clairton,Pa. U5	5.65
Gary,Ind. U5	5.65
Houston S5	5.90
KansasCity,Mo. S5	5.90
Youngstown U5	5.65

BARS, C.F. Leaded Alloy

Ambridge,Pa. W18	8.325
Camden,N.J. P13	8.35
Chicago W18	8.325
Cleveland C20	8.325
Monaca,Pa. S17	8.325
Newark,N.J. W18	8.50
SpringCity,Pa. K3	8.30
Warren,O. C17	8.575

BARS, Cold-Finished Carbon

Ambridge,Pa. W18	6.25
BeaverFalls,Pa. M12,R2	6.25
Buffalo B5	6.30
Camden,N.J. P13	6.70
Carnegie,Pa. C12	6.25
Chicago W18	6.25
Cleveland A7, C20	6.25
Detroit B5, P17	6.45
Detroit R7	6.25
Donora,Pa. A7	6.25
Elyria,O. W8	6.25
FranklinPark,Ill. N5	6.25
Gary,Ind. R2	6.25
GreenBay,Wis. F7	6.25
Hammond,Ind. L2, M13	6.25
Hartford,Conn. R2	6.75
Harvey,Ill. B5	6.25
LosAngeles(49) S30	7.70
LosAngeles R2	7.70
Mansfield,Mass. B5	6.80
Massillon,O. R2, R8	6.25
Midland,Pa. C18	6.25
Monaca,Pa. S17	6.25
Newark,N.J. W18	6.70
NewCastle,Pa.(17) B4	6.25
Pittsburgh J5	6.25
Plymouth,Mich. P5	6.50
Putnam,Conn. W18	6.80
Readville,Mass. C14	6.80
S.Chicago,Ill. W14	6.25
SpringCity,Pa. W3	6.70
Struthers,O. Y1	6.25
Waukegan,Ill. A7	6.25
Worcester,Mass. W19	6.70
Youngstown F3, Y1	6.25

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19	5.16

BARS, Cold-Finished Alloy

Ambridge,Pa. W18	7.425
BeaverFalls,Pa. M12,R2	7.425
Bethlehem,Pa. B2	7.425
Buffalo B5	7.425
Camden,N.J. P13	7.60
Canton,O. T7	7.425
Carnegie,Pa. C12	7.425
Chicago W18	7.425
Cleveland A7, C20	7.425
Detroit R7	7.425
Detroit B5, P17	7.625
Donora,Pa. A7	7.425
Elyria,O. W8	7.425
Gary,Ind. R2	7.425
GreenBay,Wis. F7	7.425
Hammond,Ind. L2, M13	7.425
Hartford,Conn. R2	7.725
Harvey,Ill. B5	7.425
Lackawanna,N.Y. B2	7.425
LosAngeles S30	9.10
Mansfield,Mass. B5	7.725
Massillon,O. R2, R8	7.425
Midland,Pa. C18	7.425
Monaca,Pa. S17	7.425
Newark,N.J. W18	7.60
Plymouth,Mich. P5	7.625
S.Chicago W14	7.425
SpringCity,Pa. K3	7.60
Struthers,O. Y1	7.425
Warren,O. C17	7.425
Waukegan,Ill. A7	7.425
Worcester,Mass. A7	7.725
Youngstown F3, Y1	7.425

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2	4.65
Atlanta A11	4.85
Birmingham C15	5.15
Buffalo R2	4.65
Cleveland R2	4.65
Ecorse,Mich. G5	4.75
Emeryville,Calif. J7	5.40
Fairfield,Ala. T2	4.65
Fairless,Pa. U5	4.80
Fontana,Calif. K1	5.35
Ft.Worth,Tex.(42) T4	5.10
Gary,Ind. U5	4.65
Houston S5	4.90

Ind.Harbor,Ind. I-2, Y1..4.65
Johnstown,Pa. B2 .....4.65
Joliet,Ill. P22 .....5.15
KansasCity,Mo. S5 .....4.90
Lackawanna,N.Y. B2 ..4.65
LosAngeles B3 .....5.35
Milton,Pa. M18 .....4.80
Minnequa,Colo. C10 ....5.10
Niles,Calif. P1 .....5.35
Pittsburg,Calif. C11 ....5.35
Pittsburgh J5 .....4.65
Portland,Oreg. O4 .....5.40
SandSprings,Okla. S5 ..5.15
Seattle B3, N14 .....5.40
S.Chicago R2 .....4.65
S.Duquesne,Pa. U5 ....4.65
S.SanFrancisco B3 .....5.40
SparrowsPoint,Md. B2 ..4.65
Sterling,Ill.(1) N15 ....4.65
Sterling,Ill. N15 .....4.75
Struthers,O. Y1 .....4.65
Torrance,Calif. C11 ....5.35
Youngstown R2, U5 ....4.65

BARS, Reinforcing
(Fabricated; to Consumers)

Johnstown,Pa. ¼-1" B2.6.15
KansasCity,Kans. S5 ...6.45
Lackawanna,N.Y. B2 ..6.17
Marion,O. P11 .....6.15
Pittsburgh U8 .....6.17
Seattle B3, N14 .....6.60
SparrowsPt. ½-1" B2 ..6.15
Williamsport,Pa. S19 ...6.00

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2..4.65
ChicagoHts.(4) C2, I-2..4.65
Ft.Worth,Tex.(26) T4 ..5.10
Franklin,Pa.(3) F5 ....4.65
Franklin,Pa.(4) F5 ....4.65
JerseyShore,Pa.(4) J8 ..4.65
Marion,O.(3) P11 .....4.65
Moline,Ill.(3) R2 .....4.80
Tonawanda(3) B12 .....5.15
Tonawanda(4) B12 .....5.15
Williamsport,Pa.(3) S19.4.65

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 11.50
Economy,Pa.(D.R.)B14 14.30
Economy(Staybolt)B14. 14.65
McK.Rks.(S.R.) L5 ...11.50
McK.Rks.(D.R.) L5 ...16.00
McK.Rks.(Staybolt) L5.17.00

SHEETS

SHEETS, Hot-Rolled Steel
(18 Gage and Heavier)

Ala.City,Ala. R2 .....4.325
Allenport,Pa. P7 .....4.325
Ashland,Ky.(8) A10 ..4.325
Cleveland J5, R2 .....4.325
Conshohocken,Pa. A3 ..4.375
Detroit(8) M1 .....4.425
Dravosburg,Pa. U5 ....4.325
Ecorse,Mich. G5 .....4.425
Fairfield,Ala. T2 .....4.325
Fairless,Pa. U5 .....4.375
Fontana,Calif. K1 ....5.125
Gary,Ind. U5 .....4.325
Geneva,Utah C11 .....4.425
GraniteCity,Ill. G4 ....4.525
Ind.Harbor,Ind. I-2,Y1.4.325
Lackawanna,N.Y. B2 ..4.325
Mansfield,O. E6 (37) ..4.325
Munhall,Pa. U5 .....4.325
Newport,Ky.(8) N9 ...4.325
Niles,O. M21 .....4.325
Pittsburg,Calif. C11 ...5.025
Pittsburgh J5 .....4.325
Portsmouth,O. P12 ....4.325
Riverdale,Ill. A1 .....4.55
Sharon,Pa. S3 .....4.325
S.Chicago,Ill. W14 ....4.325
SparrowsPoint,Md. B2.4.325
Steubenville,O. W10 ...4.325
Warren,O. R2 .....4.325
Weirton,W.Va. W6 ....4.325
Youngstown U5, Y1 ...4.325

SHEETS, H.R. (19 Ga. & Lighter)

Ala.City,Ala. R2 .....5.625
Niles,O. M21 .....5.325

SHEETS, H.R. Alloy

Ind.Harbor,Ind. Y1 ....7.20
Youngstown Y1 .....7.20

SHEETS, H.R. (14 Ga. & Heavier)
High-Strength Low-Alloy

Cleveland J5, R2 .....6.375
Conshohocken,Pa. A3 ..6.425
Dravosburg,Pa. U5 ...6.375
Ecorse,Mich. G5 .....6.475
Fairfield,Ala. T2 .....6.375
Fairless,Pa. U5 .....6.425
Fontana,Calif. K1 .....7.175
Gary,Ind. U5 .....6.375
Ind.Harbor,Ind. I-2, Y1.6.375
Lackawanna(35) B2 ...6.375
Munhall,Pa. U5 .....6.375
Pittsburgh J5 .....6.375
Sharon,Pa. S3 .....6.375
S.Chicago Ill. U5 .....6.375
SparrowsPoint(36) B2..6.375
Warren,O. R2 .....6.375
Youngstown U5, Y1 ...6.375

SHEETS, Hot-Rolled Ingot Iron
(18 Gage and Heavier)

Ashland,Ky.(8) A10 ...4.575
Ind.Harbor,Ind. I-2 ...4.575

SHEETS, Cold-Rolled Steel
(Commercial Quality)

Allenport,Pa. P7 .....5.325
Cleveland J5, R2 .....5.325
Conshohocken,Pa. A3 ..5.375
Dravosburg,Pa. U5 ....5.325
Detroit M1 .....5.325
Ecorse,Mich. G5 .....5.425
Fairfield,Ala. T2 .....5.325
Fairless,Pa. U5 .....5.375
Follansbee,W.Va. F4 ..5.325
Fontana,Calif. K1 ....6.525
Gary,Ind. U5 .....5.325
GraniteCity,Ill. G4 ....5.525
Ind.Harbor,Ind. I-2, Y1.5.325
Lackawanna,N.Y. B2 ..5.325
Mansfield,O. E6 .....5.325
Middletown,O. A10 ....5.325
Newport,Ky. N9 .....5.325
Pittsburg,Calif. C11 ...6.275
Pittsburgh J5 .....5.325
Portsmouth,O. P12 ....5.325
SparrowsPoint,Md. B2..5.325
Steubenville,O. W10 ...5.325
Warren,O. R2 .....5.325
Weirton,W.Va. W6 ....5.325
Youngstown Y1 .....5.325

SHEETS, Cold-Rolled
High-Strength Low-Alloy

Cleveland J5, R2 .....7.875
Dravosburg,Pa. U5 ....7.875
Ecorse,Mich. G5 .....7.975
Fairless,Pa. U5 .....7.925
Fontana,Calif. K1 ....9.075
Gary,Ind. U5 .....7.875
IndianaHarbor,Ind. Y1.7.875
Lackawanna(37) B2 ..7.875
Pittsburgh J5 .....7.875
SparrowsPoint(38) B2..7.875
Warren,O. R2 .....7.875
Weirton,W.Va. W6 ....7.875
Youngstown Y1 .....7.875

SHEETS, Cold-Rolled Ingot Iron

Middletown,O. A10 ....5.825

SHEETS, Culvert (16 Gage)	**Cu Alloy**	**Cu Fe**
Ashland,Ky. A10	6.90	...
Canton,O. R2	6.10	6.55
Dravosburg U5	6.10	...
Fairfield T2	6.10	...
Gary Ind. U5	6.10	6.35
Ind.Harbor I-2	6.10	6.35
Kokomo,Ind. C16	6.20	...
MartinsFry. W10	6.10	...
Newport,Ky. N9	6.10	6.35
Pitts.,Calif. C11	6.85	...
SparrowsPt. B2	6.10	...

SHEETS, Culvert—Pure Iron

Ashland,Ky. A10 .....7.15
Gary,Ind. U5 .....6.35
MartinsFry,O. W10 ....6.35

SHEETS, Galvanized Steel
Hot-Dipped

Ala.City,Ala. R2 .....5.85‡
Ashland,Ky. A10 .....5.85†
Canton,O. R2 .....5.85‡
Dover,O. R1 .....5.85†
Dravosburg,Pa. U5 ....5.85†
Fairfield,Ala. T2 .....5.85†
Gary,Ind. U5 .....5.85*
GraniteCity,Ill. G4 ....6.05
Ind.Harbor,Ind. I-2 ...5.85†
Kokomo,Ind. C16 .....5.95‡
MartinsFerry,O. W10 ..5.85*
Middletown,O. A10 ....5.85†
Newport,Ky. N9 .....5.85‡
Pittsburg,Calif. C11 ...6.60*
Pittsburgh J5 .....5.85†
SparrowsPt.,Md. B2 ...5.85†
Warren,O. R2 .....5.85†
Weirton,W.Va. W6 ...5.85*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Wall Casing

Fontana,Calif. K1 .....6.625

SHEETS, Galvanized
High-Strength Low-Alloy

Dravosburg,Pa. U5 ....8.60
SparrowsPoint(39) B2 ..8.60

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.25
Dravosburg,Pa. U5 ....6.25
Kokomo,Ind. C16 .....6.60
Newport,Ky. N9 .....6.25

SHEETS, Galvanized Ingot Iron
(Hot-dipped Continuous)

Ashland,Ky. A10 .....6.10
Middletown,O. A10 .....6.10

SHEETS, Electrogalvanized

Cleveland(28) R2 .....6.70
Niles,O.(28) R2 .....6.70
Weirton,W.Va. W6 .....6.55

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1).8.50
Butler,Pa. A10 (type 2).8.60

SHEETS, Enameling Iron

Ashland,Ky. A10 .....5.90
Cleveland R2 .....5.90
Dravosburg,Pa. U5 ....5.90
Gary,Ind. U5 .....5.90
GraniteCity,Ill. G4 .....6.10
Ind.Harbor,Ind. I-2 ....5.90
Middletown,O. A10 ....5.90
Niles,O. M21 .....5.90
Youngstown Y1 .....5.90

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ...7.75
Ind.Harbor,Ind. I-2 ....7.75
Yorkville,O. W10 .....7.75

SHEETS, Long Terne Steel
(Commercial Quality)

BeechBottom,W.Va. W10 6.25
Gary,Ind. U5 .....6.25
Mansfield,O. E6 .....6.25
Middletown,O. A10 ....6.25
Niles,O. M21 .....6.25
Weirton,W.Va. W6 .....6.25

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 .....6.65

Key To Producers

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Detroit Tube & Steel Div., Sharon Steel Corp.
D4 Disston & Sons, Henry
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G2 Globe Iron Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine& Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Prod. Div., Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New Eng. High Carb. Wire
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
N19 Northeastern Steel Corp.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke & Chem.
P7 Pittsburgh Steel Co.
P11 Follak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div., Eaton Mfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
T13 Tube Methods Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div. U. S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.
W19 Worcester Pressed Steel

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.325
Allenport,Pa. P7	4.325
Alton,Ill. L1	4.50
Ashland,Ky.(8) A10	4.325
Atlanta A11	4.525
Bessemer,Ala. T2	4.325
Birmingham C15	4.825
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.325
Conshohocken,Pa. A3	4.375
Detroit M1	4.425
Ecorse,Mich. G5	4.425
Fairfield,Ala. T2	4.325
Fontana,Calif. K1	5.125
Gary,Ind. U5	4.325
Ind.Harbor,Ind. I-2,Y1	4.325
Johnstown,Pa.(25) B2	4.325
Lackaw'na,N.Y.(24) B2	4.325
LosAngeles(25) B3	5.075
Milton,Pa. M18	4.325
Minnequa,Colo. C10	5.425
Pittsburg,Calif. C11	5.075
Riverdale,Ill. A1	4.55
SanFrancisco S7	5.05
Seattle(25) B3	5.325
Seattle N14	5.40
Sharon,Pa. S3	4.325
S.Chicago,Ill. W14	4.325
S.SanFrancisco(25) B3	5.075
SparrowsPoint,Md. B2	4.325
Sterling(1) N15	4.325
Sterling,Ill. N15	4.425
Torrance,Calif. C11	5.075
Warren,O. R2	4.325
Weirton,W.Va. W6	4.325
Youngstown U5	4.325

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.50
Carnegie,Pa. S18	7.20
Fontana,Calif. K1	8.95
Gary,Ind. U5	7.20
Ind.Harbor,Ind. Y1	7.20
LosAngeles B3	8.40
Newport,Ky. N9	7.20
Sharon,Pa. S3	7.20
S.Chicago W14	7.20
Youngstown U5, Y1	7.20

STRIP, Hot-Rolled High-Strength Low-Alloy

Bessemer,Ala. T2	6.425
Conshohocken,Pa. A3	6.425
Ecorse,Mich. G5	6.525
Fairfield,Ala. T2	6.425
Fontana,Calif. K1	7.575
Gary,Ind. U5	6.425
Houston S5	6.675
Ind.Harbor,Ind. I-2,Y1	6.425
KansasCity,Mo. S5	6.675
Lackawanna,N.Y. B2	6.425
LosAngeles(25) B3	7.175
Seattle(25) B3	7.425
Sharon,Pa. S3	6.425
S.SanFrancisco(25) B3	7.175
SparrowsPoint,Md. B2	6.425
Warren,O. R2	6.425
Weirton,W.Va. W6	6.425
Youngstown U5, Y1	6.425

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.575

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.25
Baltimore T6	6.25
Boston T6	6.80
Buffalo S40	6.25
Cleveland A7, J5	6.25
Conshohocken,Pa. A3	6.30
Dearborn,Mich. D3	6.35
Detroit D2, M1. P20	6.35
Dover,O. G6	6.25
Ecorse,Mich. G5	6.35
Follansbee,W.Va. F4	6.25
Fontana,Calif. K1	8.00
FranklinPark,Ill. T6	6.35
Ind.Harbor,Ind. I-2	6.35
Ind.Harbor,Ind. Y1	6.25
Indianapolis C8	6.40
Lackawanna,N.Y. B2	6.25
LosAngeles C1	8.30
NewBedford,Mass. R10	6.70
NewBritain(10) S15	6.25
NewCastle,Pa. B4, E5	6.25
NewHaven,Conn. A7, D2	6.70
NewKensington,Pa. A6	6.25
Pawtucket,R.I. R3	6.90
Pawtucket,R.I. N8	6.80
Pittsburgh J5	6.25
Riverdale,Ill. A1	6.35
Rome,N.Y.(32) R6	6.25
Sharon,Pa. S3	6.25
SparrowsPt.,Md. B2	6.25
Trenton,N.J.(31) R5	7.80
Wallingford,Conn. W2	6.70
Warren,O. R2, T5	6.25
Weirton,W.Va. W6	6.25
Worcester,Mass. A7	6.80
Youngstown C8, Y1	6.25

STRIP, Cold-Rolled Alloy

Boston T6	13.80
Carnegie,Pa. S18	13.45
Cleveland A7	13.45
Dover,O. G6	13.45
FranklinPark,Ill. T6	13.45
Harrison,N.J. C18	13.45
Indianapolis C8	13.60
Pawtucket,R.I. N8	13.80
Sharon,Pa. S3	13.45
Worcester,Mass. A7	13.75
Youngstown C8	13.45

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	9.10
Dearborn,Mich. D3	9.20
Dover,O. G6	9.30
Ecorse,Mich. G5	9.20
Ind.Harbor,Ind. Y1	9.30

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	7.40	9.35	10.90	13.05	15.75
Boston T6	7.65	9.35	10.90	13.05	15.75
Bristol,Conn. W1	...	...	10.90	13.05	15.75
Carnegie,Pa. S18	...	9.05	10.60	12.75	....
Cleveland A7	7.10	9.05	10.60	12.75	15.45
Cleveland C7	...	9.05	10.60	12.75	15.45
Dearborn,Mich. D3	7.20	9.15	10.70	....	....
Detroit D2	7.20	9.15	10.70	12.85	....
Dover,O. G6	7.10	9.05	10.60	12.75	15.45
FranklinPark,Ill. T6	7.20	9.05	10.60	12.75	15.45
Harrison,N.J. C18	...	...	10.90	13.05	15.75
Indianapolis C8	7.25	9.20	10.60	12.75	15.45
NewBritain,Conn.(10) S15	7.10	9.05	10.60	12.75	15.45
NewCastle,Pa. B4, E5	7.10	9.05	10.60	12.75	....
NewHaven,Conn. D2	7.55	9.35	10.90	13.05	....
NewKensington,Pa. A6	7.10	9.05	10.60	...	....
New York W3	...	9.35	10.90	13.05	15.75
Pawtucket,R.I. N8	7.65	9.35	10.90	13.05	15.75
Riverdale,Ill. A1	7.20	9.05	10.60	12.75	15.45
Rome,N.Y.(32) R6	7.10	9.05	10.60	12.75	15.45
Sharon,Pa. S3	7.10	9.05	10.60	12.75	15.45
Trenton,N.J. R5	...	...	9.35	10.90	13.05	15.75
Wallingford,Conn. W2	7.55	9.35	10.90	13.05	15.75
Warren,O. T5	7.10	9.05	10.60	12.75	15.45
Weirton,W.Va. W6	7.10	9.05	10.60	12.75	15.45
Worcester,Mass. A7, T6	7.65	9.35	10.90	13.05	15.75
Youngstown C8	7.10	9.05	10.60	12.75	15.45

Spring Steel (Tempered)

Bristol,Conn. W1	...	...	14.80	18.15	....
Buffalo W12	...	...	14.80	....	....
FranklinPark,Ill. T6	...	...	15.15	18.50	22.35
Harrison,N.J. C18	...	...	14.80	18.15	22.00
NewYork W3	...	...	14.80	18.15	22.00
Trenton,N.J. R5	...	...	14.80	18.15	22.00
Worcester,Mass. W12	...	...	14.80	....	....
Worcester,Mass. A7, T6	...	...	14.80	18.15	22.00
Youngstown C8	...	...	15.15	18.50	22.35

SILICON STEEL

H.R. SHEETS(22 Ga.,cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	...	9.95	10.95	11.85
Brackenridge,Pa. A4	...	...	9.95	10.95	11.85
Mansfield,O. E6	8.40	9.35	9.95	10.95	11.85
Newport,Ky. N9	8.40	9.35	9.95	10.95	11.85
Niles,O. M21	8.40	9.35	9.95	10.95	....
Vandergrift,Pa. U5	...	9.35	9.95	10.95	11.85
Warren,O. R2	8.40	9.35	9.95	10.95	11.85
Zanesville,O. A10	...	9.35	9.95	10.95	11.85

C.R. COILS & CUT LENGTHS, (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	...	...	10.70	11.70	12.60
GraniteCity,Ill. G4	8.50*	9.80*	10.40*	11.40	....
IndianaHarbor,Ind. I-2	8.60†	9.60*	10.20*	11.20*	....
Vandergrift,Pa. U5	8.60*	9.60*	10.20*	11.20*	12.10*
Vandergrift,Pa. U5	...	10.10†	10.70†	11.70†	12.60†
Warren,O. R2	8.60†	10.10	10.70	11.70	12.60

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grade T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	12.80	13.35	13.85	14.85
Brackenridge,Pa. A4	12.80	....	....	....
Newport,Ky. N9	12.80	....	....	....
Vandergrift,Pa. U5	12.80	13.35	13.85	14.85
Zanesville,O. A10	12.80§	13.35§	13.85§	14.85§

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	15.85	17.45	17.95	18.45	13.55**
Bulter,Pa. A10	....	....	17.45	17.95	....	....
Vandergrift,Pa. U5	14.85	15.85	17.45	17.95	....	13.55
Warren,O. R2	....	....	....	....	....	13.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. §Coils, ¾-cent higher. **Cut lengths, ¾-cent lower.

Lackawanna,N.Y. B2	9.10
Sharon,Pa. S3	9.10
SparrowsPoint,Md. B2	9.10
Warren,O. R2	9.10
Weirton,W.Va. W6	9.10
Youngstown Y1	9.30

STRIP, Electrogalvanized

Cleveland A7	6.25*
Dover,O. G6	6.25*
Riverdale,Ill. A1	6.35*
Warren,O. B9, T5	6.25*
Worcester,Mass. A7	6.80*
Youngstown C8	6.25*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.55

TIGHT COOPERAGE HOOP

Atlanta A11	5.05
Riverdale,Ill. A1	4.90
Sharon,Pa. S3	4.75
Youngstown U5	4.75

TIN MILL PRODUCTS

TIN PLATE Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$7.90	$8.15	$8.55
Dravosburg,Pa. U5	7.90	8.15	8.55
Fairfield,Ala. T2	8.00	8.25	8.65
Fontana,Calif. K1	*9.05*	*9.30*	*9.70*
Fairless,Pa. U5	8.00	8.25	8.65
Gary,Ind. U5	7.90	8.15	8.55
GraniteCity,Ill. G4	8.00	8.25	8.65
IndianaHarbor,Ind. I-2, Y1	7.90	8.15	8.55
Niles,O. R2	7.90	8.15	8.55
Pittsburg,Calif. C11	8.65	8.90	9.30
SparrowsPoint,Md. B2	8.00	8.25	8.65
Weirton,W.Va. W6	7.90	8.15	8.55
Yorkville,O. W10	7.90	8.15	8.55

ELECTROTIN (22-27 Gage; Dollars per 100 lb)

Aliquippa,Pa. J5	6.675	....	....
Niles,O. R2	6.675	6.875	7.075

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	9.20	$9.45
Dravosburg,Pa. U5	9.20	9.45
Fairfield,Ala. T2	9.30	9.55
Fairless,Pa. U5	9.30	9.55
Fontana,Calif. K1	*10.35*	*10.60*
Gary,Ind. U5	9.20	9.45
Ind.Har. I-2, Y1	9.20	9.45
Pitts.,Calif. C11	9.95	10.20
Sp.Pt.,Md. B2	9.30	9.55
Weirton,W.Va. W6	9.20	9.45
Yorkville,O. W10	9.20	9.45

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$7.00
Dravosburg,Pa. U5	7.00
Fairfield,Ala. T2	7.10
Fairless,Pa. U5	7.10
Fontana,Calif. K1	*8.15*
Gary,Ind. U5	7.00
Granite City,Ill. G4	7.10
Ind.Harbor,Ind. I-2, Y1	7.00
Niles,O. R2	7.00

Pittsburg,Calif. C11	7.75
SparrowsPoint,Md. B2	7.10
Warren,O. R2	7.00
Weirton,W.Va. W6	7.00
Yorkville,O. W10	7.00

HOLLOWARE ENAMELING Black Plate (29 Gage)

Dravosburgh,Pa. U5	6.65
Gary,Ind. U5	6.65
GraniteCity,Ill. G4	6.75
Ind.Harbor,Ind. Y1	6.65
Yorkville,O. W10	6.65

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$8.70
Gary,Ind. U5	8.70
Yorkville,O. W10	8.70

MANUFACTURING TERNES (Light Coated, 6 lb; Base Box)

Yorkville,O. W10	$9.15

ROOFING SHORT TERNES (8lb Coated; Base Box)

Gary,Ind. U5	$10.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	6.60
Aliquippa,Pa. J5	6.60
Alton,Ill.L1	6.775
Atlanta A11	6.80
Bartonville,Ill. K4	6.70
Buffalo W12	6.60
Chicago W13	6.60
Cleveland A7	6.60
Crawfordsville,Ind. M8	6.70
Donora,Pa. A7	6.60
Duluth,Minn. A7	6.60
Fairfield,Ala. T2	6.60
Fostoria,O. (24) S1	6.80
Houston S5	6.85
Jacksonville,Fla. M8	6.95
Johnstown,Pa. B2	6.60
Joliet,Ill. A7	6.60
KansasCity,Mo. S5	6.85
Kokomo,Ind. C16	6.70
LosAngeles B3	7.55
Minnequa,Colo. C10	6.85
Monessen,Pa. P7	6.60
Newark 6-8 ga. I-1	6.90
N.Tonawanda B11	6.60
Palmer,Mass. W12	6.90
Pittsburg,Calif. C11	7.20
Portsmouth,O. P12	6.60
Rankin,Pa. A7	6.60
S.Chicago,Ill. R2	6.60
S.SanFrancisco C10	7.55
SparrowsPoint,Md. B2	6.70
Sterling,Ill.(1) N15	6.60
Sterling,Ill. N15	6.70
Struthers,O. Y1	6.60
Waukegan,Ill. A7	6.60
Worcester,Mass. A7	6.90

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	7.90
Alton,Ill. L1	8.075
Bartonville,Ill. K4	8.00
Buffalo W12	7.90
Cleveland A7	7.90
Donora,Pa. A7	7.90
Duluth,Minn. A7	7.90
Fostoria,O. S1	7.95
Johnstown,Pa. B2	7.90
LosAngeles B3	8.85
Milbury,Mass.(12) N6	8.20
Minnequa,Colo. C10	8.15
Monessen,Pa. P16	7.90
Muncie,Ind. I-7	8.10
Palmer,Mass. W12	8.20
Pittsburg,Calif. C11	8.85
Portsmouth,O. P12	7.90
Roebling,N.J. R5	8.20
S.Chicago,Ill. R2	7.90
S.SanFrancisco C10	8.85
SparrowsPt.,Md. B2	8.00
Struthers,O. Y1	7.90
Trenton,N.J. A7	8.20
Waukegan,Ill. A7	7.90
Worcester A7,J4,T6,W12	8.20

WIRE, Upholstery Spring

Aliquippa,Pa. J5	7.60
Alton,Ill. L1	7.775
Buffalo W12	7.60
Cleveland A7	7.60
Donora,Pa. A7	7.60
Duluth,Minn. A7	7.60
Johnstown,Pa. B2	7.60
KansasCity,Mo. S5	7.85
LosAngeles B3	8.55
Minnequa,Colo. C10	7.775
Monessen,Pa. P16	7.60
NewHaven,Conn. A7	7.90
PalmerMass. W12	7.90
Pittsburg,Calif. C11	8.55
Portsmouth,O. P12	7.60
Roebling,N.J. R5	7.90
S.Chicago,Ill. R2	7.60
S.SanFrancisco C10	8.55
SparrowsPoint,Md. B2	7.70
Struthers,O. Y1	7.60
Trenton,N.J. A7	7.90
Waukegan,Ill. A7	7.60
Worcester,Mass. A7	7.90

WIRE, Fine & Weaving(8"Coils)

Alton,Ill. L1	12.725
Bartonville,Ill. K4	12.65
Buffalo W12	12.55
Chicago W13	12.55
Cleveland A7	12.55
Crawfordsville,Ind. M8	12.65
Fostoria,O. S1	12.55
Jacksonville,Fla. M8	12.90
Johnstown,Pa. B2	12.55
Kokomo,Ind. C16	12.55
Minnequa,Colo. C10	12.30
Monessen,Pa. P6	12.55
Muncie,Ind. I-7	12.75
Palmer,Mass. W12	12.85
Roebling,N.J. R5	12.85
S.SanFrancisco C10	12.90
Waukegan,Ill. A7	12.55
Worcester,Mass. A7,T6	12.85

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	10.70
Buffalo W12	10.70
Johnstown,Pa. B2	10.70
Minnequa,Colo. C10	10.825
Monessen,Pa. P16	10.70
Muncie,Ind. I-7	10.90
Palmer,Mass. W12	11.00
Pittsburg,Calif. C11	11.50
Portsmouth,O. P12	10.70
Roebling,N.J. R5	11.00
SparrowsPt.,Md. B2	10.80
Struthers,O. Y1	10.70

ROPE WIRE (A)

Bartonville,Ill. K4	10.55
Buffalo W12	10.55
Fostoria,O. S1	10.55
Johnstown,Pa. B2	10.55
Monessen,Pa. P16	10.55
Muncie,Ind. I-7	10.75
Palmer,Mass. W12	10.85
Portsmouth,O. P12	10.55
Roebling,N.J. R5	10.85
SparrowsPt. B2	10.65
Struthers,O. Y1	10.55
Worcester,Mass. J4	10.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE
(Continued)

WIRE, Tire Bead

Bartonville,Ill. K4	14.15
Monessen,Pa. P16	14.20
Roebling,N.J. R5	14.35

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	9.50
Baltimore T6	9.80
Boston T6	9.80
Buffalo W12	9.50
Cleveland A7	9.50
Crawfordsville,Ind. M8	9.00
Dover,O. G6	9.50
Fostoria,O. S1	9.50
FranklinPark,Ill. T6	9.60
Kokomo,Ind. C16	9.50
Massillon,O. R8	9.50
Milwaukee C23	9.70
Monessen,Pa. P16	9.50
Pawtucket,R.I. N8	9.80
Riverdale,Ill. A1	9.60
Rome,N.Y. R6	9.50
Trenton,N.J. R5	9.80
Worcester A7, T6, W12	9.80

NAIL, Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Chicago,Ill. W13	152
Cleveland A9	157
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Galveston,Tex. D7	157
Houston,Tex. S5	157
Jack'ville,Fla.(23) M8	162
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
KansasCity,Mo. S5	157
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
S.Chicago,Ill. R2	152
SparrowsPt.,Md. B2	154
Sterling,Ill.(1) N15	152
Worcester,Mass. A7	158

NAILS, CUT (100 lb keg)

To Dealers (33)	
Conshohocken,Pa. A3	$9.05
Wheeling,W.Va. W10	9.05

STAPLES, Polished Stock

To Dealers & Mfrs. (7)	Col.
AlabamaCity,Ala. R2	152
Aliquippa,Pa. J5	152
Atlanta A11	154
Bartonville,Ill. K4	154
Crawfordsville,Ind. M8	154
Donora,Pa. A7	152
Duluth,Minn. A7	152
Fairfield,Ala. T2	152
Jack'ville,Fla.(23) M8	162
Johnstown,Pa. B2	152
Joliet,Ill. A7	152
Kokomo,Ind. C16	154
Minnequa,Colo. C10	157
Monessen,Pa. P7	152
Pittsburg,Calif. C11	171
Rankin,Pa. A7	152
S.Chicago,Ill. R2	152
SparrowsPt., Md. B2	154
Sterling,Ill. (1) N15	152
Worcester,Mass. A7	158

TIE WIRE, Automatic Baler (14½ Ga.) (Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	$9.45
Bartonville,Ill. K4	9.45
Buffalo W12	9.45
Crawfordsville,Ind. M8	9.45
Donora,Pa. A7	9.45
Duluth,Minn. A7	9.45
Jacksonville,Fla. M8	9.88
Johnstown,Pa. B2	9.45
Joliet,Ill. A7	9.45
Kokomo,Ind. C16	9.45
LosAngeles B3	10.24
Minnequa,Colo. C10	9.60
Pittsburg,Calif. C11	10.23
S.Chicago,Ill. R2	9.45
SparrowsPt.,Md. B2	9.55
Sterling,Ill. N15	9.35

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	$9.75
Bartonville,Ill. K4	9.75
Buffalo W12	9.75
Crawfordsville,Ind. M8	9.75
Donora,Pa. A7	9.75
Duluth,Minn. A7	9.75
Jacksonville,Fla. M8	10.18
Johnstown,Pa. B3	9.75
Joliet,Ill. A7	9.75
Kokomo,Ind. C16	9.75
LosAngeles B3	10.65
Minnequa,Colo. C10	9.90
Pittsburg,Calif. C11	10.55
S.Chicago,Ill. R2	9.75
SparrowsPt.,Md. B2	9.85
Sterling,Ill. N15	9.65

Coil No. 6500 Interim	
AlabamaCity,Ala. R2	$9.80
Bartonville,Ill. K4	9.80
Buffalo W12	9.80
Crawfordsville,Ind. M8	9.80
Donora,Pa. A7	9.80
Duluth,Minn. A7	9.80
Jacksonville,Fla. M8	10.23
Johnstown,Pa. B2	9.80
Joliet,Ill. A7	9.80
Kokomo,Ind. C16	9.80
LosAngeles B3	10.60
Minnequa,Colo. C10	9.95
Pittsburg,Calif. C11	10.60
S.Chicago, Ill. R2	9.80
SparrowsPt.,Md. B2	9.90
Sterling,Ill. N15	9.70

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	175**
Aliquippa,Pa. J5	172§
Atlanta A11	181
Bartonville,Ill. K4	181
Crawfordsville,Ind. M8	181
Donora,Pa. A7	175†
Duluth,Minn. A7	175†
Fairfield,Ala. T2	175†
Houston,Tex. S5	180**
Jacksonville,Fla. M8	186
Johnstown,Pa. B2	179*
Joliet,Ill. A7	175†
KansasCity,Mo. S5	180**
Kokomo,Ind. C16	177†
Minnequa,Colo. C10	180**
Monessen,Pa. P7	178††
Pittsburg,Calif. C11	195†
Rankin,Pa. A7	175†
S.Chicago,Ill. R2	175**
S.SanFrancisco C10	195**
SparrowsPoint,Md. B2	181*
Sterling,Ill.(1) N15	179††

WOVEN FENCE, 9-15 ga.

	Col.
Ala.City,Ala. R2	162**
Ala.City, 17 ga. R2	257**
Aliq'ppa,Pa.9-14½ga J5	165§
Atlanta A11	168
Bartonville,Ill. K4	168
Crawfordsville,Ind. M8	168
Donora,Pa. A7	162†
Duluth,Minn. A7	162†
Fairfield,Ala. T2	162†
Houston,Tex. S5	167**
Jacksonville,Fla. M8	173
Johnstown,Pa.(43) B2	166
Joliet,Ill. A7	162†
KansasCity,Mo. S5	167**
Kokomo,Ind. C16	164†
Minnequa,Colo. C10	167**
Monessen,Pa. 9 ga. P17	166††
Pittsburg,Calif. C11	185†
Rankin,Pa. A7	162†
S.Chicago,Ill. R2	162**
Sterling,Ill.(1) N15	166††

WIRE (16 Gage)	An'ld Stone	Galv. Stone
Ala.City R2	14.50	16.05**
Bartonville K4	14.50	16.55
Buffalo W12	14.50	....
Cleveland A7	14.50	....
Crawf'dsville M8	14.60	16.55
Fostoria,O. S1	14.60	16.15†
Jacksonville M8	14.85	16.80
Johnstown B2	14.50	16.40*
Kokomo C16	14.60	16.15†
Minnequa C10	14.75	16.45**
Palmer,MassW12	14.50	16.05*
Pitts.,Calif. C11	14.85	16.40†
S.Chicago R2	14.50	16.05**
SparrowsPt. B2	14.60	16.50*
Sterling(1) N15	14.50	16.45††
Waukegan A7	14.50	16.05
Worcester A7	14.80	....

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	7.50	7.90**
Aliquippa J5	7.40	7.925§
Atlanta A11	7.60	8.20
Bartonville(48) K4	7.60	8.20
Buffalo W12	7.50	7.90†
Cleveland A7	7.50	....
Crawfordsville M8	7.50	8.10
Donora,Pa. A7	7.50	7.90†
Duluth,Minn. A7	7.50	7.90†
Fairfield T2	7.50	7.90†
Houston(48) S5	7.65	8.05**
Jacks'ville,Fla.M8	7.75	8.35
Johnstown B2(48)	7.50	8.10*
Joliet,Ill. A7	7.50	7.90†
Kans.City(48) S5	7.65	8.05**
Kokomo C16	7.50	7.90†
LosAngeles B3	8.45	9.05*
Minnequa C10	7.65	8.05**
Monessen P7(48)	7.40	8.00††
Palmer,Mass. W12	7.80	8.20†
Pitts.,Calif. C11	8.45	8.85†
Portsmouth,O. P12	7.50	....
Rankin A7	7.50	7.90†
S.Chicago R2	7.50	7.90**
S.SanFran. C10	8.35	8.75**
Spar'wsPt. B2(48)	7.60	8.20*
Str'ling(1)(48) N15	7.40	8.00††
Struthers,O.(48) Y1	*7.50*	*8.00‡*
Worcester,Mass. A7	7.80	8.20†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††13c. **Subject to zinc equalization extras.

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	175
Atlanta A11	175
Bartonville,Ill. K4	177
Crawfordsville,Ind. M8	175
Donora,Pa. A7	175
Duluth,Minn. A7	175
Fairfield,Ala. T2	175
Jacksonville,Fla. M8	180
Joliet,Ill. A7	175
Houston S5	178
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Pitts.,Calif. C11	199
S.Chicago R2	175
S.SanFran.,Calif. C10	197
SparrowsPoint,Md. B2	177
Sterling,Ill.(1) N15	173

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2, I-2	157
Duluth,Minn. A7	157
Franklin,Pa. F5	157
Huntington,W.Va. W7	157
Johnstown,Pa. B2	157
Marion,O. P11	157
Minnequa,Colo. C10	162
Moline,Ill. R2	162
S.Chicago,Ill. R2	157
Tonawanda,N.Y. B12	157
Williamsport,Pa. S10	160

FASTENERS

(Base discounts, full case quantity, per cent off list to consumer, f.o.b. mill)

Carriage, Machine Bolts

Full-Size Body (cut thread)

†½" x 6" and smaller	61
Larger than ½" diam. and all diams. longer than 6"	55
Under-Size Body (rolled thread; not nutted): ½" x 6" and smaller.	61

†½" x 4" and smaller and shorter are not nutted.

Carriage, Machine & Lag Bolts, Hot Galvanized:

½" and smaller	42
Larger than ½" diam. and all diams. longer than 6"	32

Lag Bolts

All diams. & 6" and shorter	61
All diams. longer than 6"	55

Plow, Tap & Blank Bolts

½" x 6" and smaller.	61
Larger than ½" diam. and all diams. longer than 6"	55

Ribbed Neck, Carriage, Step, Elevator, Fitting-up and Tire Bolts:

All sizes	61

STOVE BOLTS, SLOTTED

(nuts not attached; bulk)

⅛" to ¼" diam. incl., 3" or shorter:	
25,000 to 199,999 pieces	61
200,000 or more pieces	64
⅛" to ½" diam. incl., 3" or shorter:	
15,000 to 99,999 pieces	61
100,000 or more pieces	64
Longer than 3", any diam.:	
5000 to 99,999 pieces	61
100,000 or more pieces	64

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago, and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 9.95
⅞-in. under..List less 32%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	21.06	20.42
1¼	13	....	24.94	20.45
1½	13	23.31	27.57	22.61
1¾	13	27.54	32.57	26.71
2	13	30.87	36.51	29.93
2¼	13	34.77	41.12	33.72
2½	12	37.73	44.63	36.60
2½	12	41.57	49.16	40.31
2¾	12	45.00	53.22	43.65
3	12	47.99	56.76	46.55

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Standard All	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	4.725	4.625	4.675	5.65
Ensley,Ala. T2	4.725	4.625	....	5.65
Fairfield,Ala. T2	....	....	....	5.65
Gary,Ind. U5	4.725	4.625	4.675	....
Huntington,W.Va. W7	....	....	....	5.65
IndianaHarbor,Ind. I-2	4.725	4.625	4.675	....
Johnstown,Pa. B2	....	....	....(16)	5.65
Lackawanna,N.Y. B2	4.725	4.625	....(16)	5.65
Minnequa,Colo. C10	4.725	4.625	....	6.15
Steelton,Pa. B2	4.725	4.625	....	....
Williamsport,Pa. S19	....	....	....	5.65

TIE PLATES

Fairfield,Ala. T2	5.625
Gary,Ind. U5	5.625
Ind.Harbor,Ind. I-2	5.625
Lackawanna,N.Y. B2	5.625
Minnequa,Colo. C10	5.625
Seattle B3	5.775
Steelton,Pa. B2	5.625
Torrance,Calif. C11	5.775

TRACK BOLTS, Untreated

Cleveland R2	12.15
KansasCity,Mo. S5	12.90*
Lebanon,Pa. B2	12.15
Minnequa,Colo. C10	12.15
Pittsburgh O3, P14	12.15
Seattle B3	12.65

*Treated

AXLES

Ind.Harbor,Ind. S13	7.50
Johnstown,Pa. B2	7.50
Bessemer,Pa. U5	5.825
Fairfield,Ala. T2	5.825
Ind.Harbor,Ind. I-2	5.825
Joliet,Ill. U5	5.825
Lackawanna,N.Y. B2	5.825
Minnequa,Colo. C10	5.825
Steelton,Pa. B2	5.825

SCREW SPIKES

Cleveland R2	11.90
Pittsburgh O3	11.90

STANDARD TRACK SPIKES

Fairfield,Ala. T2	8.05
Ind.Harbor,Ind. Y1	*8.05*
Ind.Harbor,Ind. I-2	7.90
KansasCity,Mo. S5	7.90
Lebanon,Pa. B2	8.05
Minnequa,Colo. C10	7.90
Pittsburgh J5	8.05
Seattle B3	8.05
S.Chicago,Ill. R2	8.05
Struthers,O. Y1	*8.05*
Youngstown R2	8.05

METAL POWDER

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

Sponge iron:	Cents
98+% Fe, annealed.	9.25
Swedish, c.i.f., Camden, N. J., c.l. in bags..	9.50
Domestic:	
F.o.b., Johnstown, Pa., Niagara Falls, N.Y., in bags	9.50
F.o.b. Riverton, N. J., in bags....	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	22.00
Annealed, 99.5% Fe.	36.50
Unannealed (99+% Fe)	34.00
Unannealed (99+% Fe) (minus 325 mesh)	57.00
Powder Flakes (minus 16, plus 100 mesh)..	31.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, 86.00-275.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb. drum frght. allowed	
Carlots	34.50
Ton lots	36.50
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	41.75-65.25†
Bronze, 5000-lb lots	67.50-71.75†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed ...	$1.00
Nickel-Silver, 5000-lb lots	62.75-65.25†
Phosphor-Copper, 5000-lb lots	68.75
Silicon	47.50
Solder	7.00*
Stainless Steel, 302 ..	99.00
Stainless Steel, 316 ..	$1.32
Tin	14.50*
Zinc 5000-lb lots	19.25-33.00‡
Tungsten	Dollars
Melting grade, 99% 60 to 200 mesh:	
1000 lb and over...	4.50
Less than 1000 lb..	4.65
Chromium, electrolytic 99.8% Cr min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛-in. to less than 1 7/16-in.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Plus 4c per 100 lb.
(24) Deduct 0.10c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.25c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 6.90c for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 13 Ga. & heavier; 60" & narrower.
(38) 14 Ga. & Lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.25c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 7.95c over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25
Ambridge, Pa. N2	6.5	....	10.5	....	13	....	14.5	....	14.5	....	14	....	16.5	....
Lorain, O. N3	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25
Youngstown Y1	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	6.5	+11.5	10.5	+8.25	13	+5.75	14.5	+4.25	14.5	+4.25	14	+4.75	16.5	+2.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Alton, Ill. L1	....	....	....	....	....	....	16.5	+2.75	19.5	1.25	22	4.75	24.5	6.5
Benwood, W. Va. W10	17.5	+13	9	+18.5	+0.75	+28.5	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Butler, Pa. F6	18	+12.5	9.5	+18	1.5	+26	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Fairless, Pa. N3	....	....	....	....	....	....	16.5	+2.75	19.5	1.25	22	4.75	24.5	6.5
Fontana, Calif. K1	....	....	....	....	....	....	6	+13.25	9	+9.25	11.5	+5.75	14	+4
Ind. Harbor, Ind. Y1	....	....	....	....	....	....	17.5	+1.75	20.5	2.25	23	5.75	25.5	7.5
Lorain, O. N3	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Sharon, Pa. S4	18	+12.5	9.5	+18	1.5	+26	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Sparrows Pt., Md. B2	16	+12.5	7.5	+18	+0.5	+25	16.5	+0.75	19.5	3.25	22	6.75	24.5	8
Youngstown R2, Y1	....	....	....	....	....	....	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5
Wheatland, Pa. W9	18	+12.5	9.5	+18	1.5	+26	18.5	+0.75	21.5	3.25	24	6.75	26.5	8.5

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Alton, Ill. L1	25	7.5	25.5	8	27	8.75	27	8.75	....	....	....	....
Benwood, W. Va. W10	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Etna, Pa. N2	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Fairless, Pa. N3	25	7.5	25.5	8	27	8.75	27	8.75	17.5	+1.25	17.5	+1.25
Fontana, Calif. K1	14.5	+3	15	+2.5	16.5	+1.75	16.5	+1.75	7	+11.75	7	+11.75
Ind. Harbor, Ind. Y1	26	8.5	26.5	9	28	9.75	28	9.75	18.5	+0.25	18.5	+0.25
Lorain, O. N3	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Sharon, Pa. M6	27	9.5	27.5	10	29	10.75	29	10.75	....	....	....	....
Sparrows Pt., Md. B2	25	9	25.5	9.5	27	9.75	27	9.75	17.5	+0.25	17.5	+0.25
Wheatland, Pa. W9	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75
Youngstown R2, Y1	27	9.5	27.5	10	29	10.75	29	10.75	19.5	0.75	19.5	0.75

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Billets— Forging	Seamless Tube	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	18.50	23.00	....	....	31.00	....	....	....	42.25	39.00
202	19.75	25.50	31.00	36.25	33.50	....	36.75	38.75	42.50	42.50
301	19.25	23.75	....	36.75	32.00	36.00	38.00	....	44.25	41.00
302	20.50	26.25	32.00	37.25	34.50	36.25	38.25	40.25	44.50	44.50
302B	20.25	26.50	33.00	37.25	37.75	36.25	38.25	40.25	47.00	47.00
303	....	26.75	34.75	40.00	....	39.00	41.00	....	....	....
304	21.75	27.50	33.75	39.00	37.25	38.25	40.25	43.00	47.25	47.25
304L	....	....	38.75	44.00	42.25	43.25	45.25	48.00	52.25	52.25
305	23.25	30.25	....	39.50	40.25	38.25	40.25	43.50	50.25	50.25
308	23.50	30.50	38.50	44.25	41.25	43.25	45.50	49.75	52.00	52.00
309	31.00	39.75	46.75	53.50	53.50	52.00	54.75	58.25	67.00	67.00
310	37.25	48.00	62.25	72.25	68.50	69.75	73.50	75.25	78.75	78.75
314	....	....	....	....	....	69.75	....	75.25	....	....
316	31.50	40.25	51.25	59.50	58.25	57.75	60.75	64.00	68.25	68.25
316L	....	....	56.25	64.50	63.25	62.75	65.75	69.00	73.25	73.25
317	37.25	48.25	62.75	72.75	75.50	70.75	74.50	77.00	83.75	83.75
321	25.00	32.00	38.25	44.00	44.25	43.00	45.25	49.25	54.25	54.25
18-8CeTa	29.25	38.00	45.75	52.25	53.25	50.75	53.50	58.00	66.50	66.50
403	....	....	28.75	32.75	....	32.25	34.00	36.25	....	....
405	17.50	23.00	26.75	31.00	32.25	30.50	32.00	33.75	42.25	42.25
410	15.00	19.50	25.50	29.50	28.00	29.00	30.50	31.75	36.25	36.25
416	....	....	26.00	30.00	....	29.50	31.00	....	....	....
420	....	30.25	31.00	36.00	37.75	35.50	37.25	40.75	56.00	56.00
430	15.25	19.75	26.00	30.00	28.75	29.50	31.00	32.25	34.50	36.75
430F	....	....	26.50	30.50	....	30.00	31.50	....	....	....
431	....	25.50	33.25	....	....	37.25	39.25	40.75	....	....
446	....	....	35.50	40.50	53.25	40.00	42.00	43.25	63.25	63.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U. S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Carpenter Steel Co.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Ellwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McLouth Steel Corp.; Metal Forming Corp.; McInnes Steel Co.; National-Standard Co.; National Tube Div., U. S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Tube Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sharon Steel Corp.; Sawhill Tubular Products Inc.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp., Superior Tube Co.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates— Carbon Base 10%	20%	Sheets Carbon Base 20%
302	....	....	30.50
304	30.30	36.05	32.50
304-L	32.30	37.95	....
310	41.30	47.00	....
316	35.50	41.40	47.00
316-L	40.00	46.10	....
316-CB	41.15	48.45	....
321	32.00	37.75	37.25
347	34.40	41.40	48.25
405	25.80	33.35	....
410	25.30	32.85	....
430	25.30	32.85	....
Inconel	49.45	65.45	....
Nickel	41.05	55.65	....
Nickel, Low Carbon	43.25	60.05	....
Monel	42.35	56.35	....
Copper*	....	....	46.00

	Strip, Carbon Base— Cold Rolled— 10%	Both Sides
Copper*	32.75	41.25

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.275	5% Cr Hot Work	0.430-0.460
Extra Carbon	0.330	W-Cr Hot Work	0.450
Special Carbon	0.390	V-Cr Hot Work	0.470
Oil Hardening	0.430	Hi-Carbon-Cr	0.770

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	...	4.090
18.25	4.25	1	4.75	...	2.305-2.475
18	4	2	9	...	2.675-2.6775
18	4	2	....	...	1.765
18	4	1	....	...	1.600
13.75	3.75	2	5	...	2.245
13.5	4	3	....	...	1.865
9	3.5	..	....	...	1.180
6	4	2	....	5	1.105
6	4	3	....	6	1.350
1.5	4	1	....	8.5	0.960

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, J3, M14, S8, U4, V2 and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
AlabamaCity,Ala. R2	54.50	....	....	....
Birmingham R2	54.50	55.00‡	....	....
Birmingham U6	....	55.00‡	59.00	....
Woodward,Ala. W15	54.50	55.00‡	59.00	....
Cincinnati, deld.	....	62.70	....	....
Buffalo District				
Buffalo H1, R2	60.00	60.50	61.00	61.50
Tonawanda,N.Y. W12	60.00	60.50	61.00	61.50
N.Tonawanda,N.Y. T9	....	60.50	61.00	61.50
Boston, deld.	70.65	71.15	71.65	....
Rochester,N.Y. deld.	63.02	63.52	64.02	....
Syracuse,N.Y. deld.	64.12	64.62	65.12	....
Chicago District				
Chicago I-3	60.00	60.50	60.50	61.00
Gary,Ind. U5	60.00	....	60.50	....
S.Chicago R2	60.00	....	60.50	....
S.Chicago,Ill. Y1	60.00	60.50	60.50	61.00
S.Chicago,Ill. U5, W14	60.00	....	60.50	61.00
Milwaukee, deld.	62.30	62.80	62.80	63.30
Muskegon,Mich. deld.	....	67.18	67.18	....
Cleveland District				
Cleveland R2, A7	60.00	60.50	60.50	61.00
Akron,O. deld.	62.75	63.25	63.25	63.75
Mid-Atlantic District				
Bethlehem,Pa. B2	62.00	62.50	63.00	63.50
NewYork, deld.	....	66.51	67.01	....
Newark, deld.	65.20	65.70	66.20	66.70
Birdsboro,Pa. B10	62.00	62.50	63.00	63.50
Chester,Pa. P14	62.00	62.50	63.00	....
Philadelphia, deld.	63.76	64.26	64.76	....
Steelton,Pa. B2	62.00	62.50	63.00	63.50
Swedeland,Pa. A3	62.00	62.50	63.00	63.50
Philadelphia, deld.	63.76	64.26	64.76	65.26
Troy,N.Y. R2	62.00	62.50	63.00	63.50
Pittsburgh District				
NevilleIsland,Pa. P6	60.00	60.50	60.50	....
Pittsburgh (N&S sides), Aliquippa, deld.	....	61.95	61.95	62.48
McKeesRock, deld.	....	61.60	61.60	62.13
Lawrenceville,Homestead, Wilmerding,Monaca, deld.	....	62.26	62.26	62.79
Verona,Trafford, deld.	62.29	62.82	62.82	63.35
Brackenridge, deld.	62.60	63.10	63.10	63.63
Bessemer,Pa. U5	60.00	....	60.50	61.00
Clairton,Rankin,S.Duquesne,Pa. U5	60.00	....	....	....
Midland,Pa. C18	60.00	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard,O. Y1	....	....	60.50	....
Sharpsville,Pa. S6	60.00	....	60.50	61.00
Youngstown Y1	....	....	60.50	61.00
Youngstown U5	60.00	....	....	61.00
Mansfield,O. deld.	64.90	....	65.40	65.90
Duluth I-3	60.00	60.50	60.50	61.00
Erie,Pa. I-3	60.00	60.50	60.50	61.00
Everett,Mass. E1	62.00	62.50	63.00	....
Fontana,Calif. K1	67.50	68.00	....	....
Geneva,Utah C11	60.00	60.50	....	....
GraniteCity,Ill. G4	61.90	62.40	62.90	....
Ironton,Utah C11	60.00	60.50	....	....
LoneStar,Texas L6	....	55.00*	....	....
Minnequa,Colo. C10	62.00	62.50	63.00	....
Rockwood,Tenn. T3	....	55.00‡	59.00	....
Toledo,O. I-3	60.00	60.50	60.50	61.00
Cincinnati, deld.	65.76	66.26	....	....

*Phos. 0.51-0.75%; $36, Phos. 0.31-0.50%.
‡Intermediate (Phos. 0.31-0.69%), $56.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos iron on which base is 1.75-2.00%.
Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.
Nickel: Under 0.05% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. G2, J1	69.00
Buffalo H1	70.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

NiagaraFalls,N.Y. P15	$92.50
Keokuk,Iowa, Open-hearth & Fdry, freight allowed K2)	97.00
Keokuk, O. H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	100.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$72.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	72.50
Steelton,Pa. B2 (Phos. 0.035% max)	68.00
Philadelphia, deld.	71.55
Troy,N.Y. R2 Phos. 0.035% max)	68.00
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	65.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	65.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	65.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	65.00

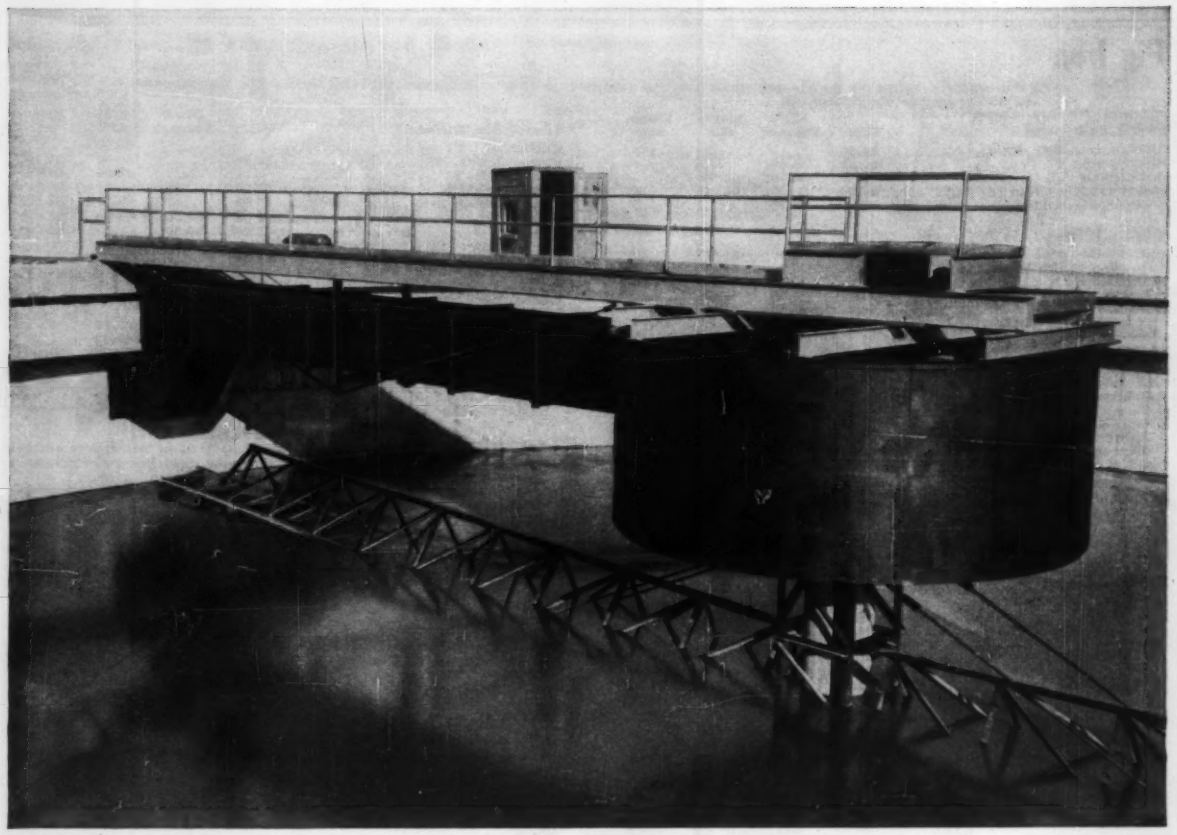
Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: St. Paul, 25 cents; Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, San Francisco, 10 cents; Atlanta, Houston, Seattle, Spokane, no charge.

	SHEETS				STRIP	BARS				Standard	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Mer-chant Qual.	H.R. Spec. Qual.	C.F. Rds.‡	H.R. Alloy 4140††§	Structural Shapes	Carbon	Floor
Atlanta	7.14	8.20	8.87	....	7.40	7.42	...	9.39	....	7.63	7.49	9.48
Baltimore	7.24	8.35	8.50	....	7.70	7.70	...	8.49§	14.39	7.94	7.56	9.02
Birmingham	7.13	8.24	8.85	....	7.21	7.27	7.80	9.35	....	7.43	7.45	9.50
Boston	8.12	9.07	10.32	53.32	8.21	8.21	8.76	9.73	13.56	8.27	8.41	9.84
Buffalo	7.20	8.25	10.01	....	7.35	7.35	8.05	7.90	13.35	7.60	7.65	9.00
Chattanooga	7.28	8.44	8.60	....	7.36	7.42	7.95	9.18	....	7.63	7.60	9.32
Chicago	7.13	8.24	9.10	46.75	7.21	7.27	7.80	7.75	13.05	7.43	7.45	8.72
Cincinnati	7.25	8.23	9.10	46.10	7.45	7.51	8.04	8.15	13.29	7.90	7.74	8.97
Cleveland	7.13	8.24	8.95	49.16	7.31	7.33	7.86	8.00	13.11	7.76	7.62	8.89
Denver	8.95	10.31	11.73	....	9.10	9.10	...	9.82	17.87	8.95	9.10	10.50
Detroit	7.32	8.43	9.38	43.50	7.49	7.55	8.08	8.04	13.25	7.90	7.73	8.91
Erie, Pa.	7.08	8.24	8.95¹⁰	....	7.31	7.35	...	8.10¹⁰	....	7.65	7.30	8.79
Houston	7.85	8.75	10.49	....	8.15	8.25	...	9.85	14.00	8.20	7.80	9.20
Jackson, Miss.	7.46	8.52	9.22	....	7.44	7.59	8.12	9.44	....	7.75	7.77	9.44
Los Angeles	8.15	10.00	11.00	51.50	8.50	8.15	8.70	10.90	14.35	8.30	8.75	10.85
Milwaukee	7.22	8.33	9.19	....	7.30	7.36	7.89	7.94	13.14	7.60	7.54	8.81
Moline, Ill.	7.15	8.44	8.85	....	7.41	7.43	...	8.10	....	7.63	7.34	...
New York	7.78	8.88	9.63	53.13	8.23	8.16	8.71	9.77	13.47	8.11	8.21	9.50
Norfolk, Va.	7.35	...	...	....	7.80	7.85	...	9.95	....	8.10	7.60	9.10
Philadelphia	7.34	8.44	9.41	45.98	7.99	7.73	8.26	8.52	13.25	7.75	7.72	8.83**
Pittsburgh	7.13	8.24	9.40	49.00	7.21	7.27	7.80	8.00	13 05	7.43	7.45	8.72
Portland, Oreg.	7.80	8.80	10.65	....	8.00	7.95	...	12.20	15.00	7.85	7.75	9.60
Richmond, Va.	7.25	...	9.49	....	7.85	7.85	...	9.50	....	8.10	7.50	9.35
St. Louis	7.42	8.53	9.69	43.89	7.50	7.56	8.09	8.29	13.34	7.83	7.74	9.01
St. Paul	7.46	8.59	9.16	....	7.72	7.74	...	8.51	13.51	7.94	7.65	9.12
San Francisco	8.20	9.65	10.15	51.65	8.35	8.15	8.70	11.45	14.35§	8.25	8.30	10.50
Seattle	7.85	10.50	10.90	54.00	8.90	8.60	9.15	12.25	14.65	8.50	8.50	10.70
Spokane	8.75	11.10⁷	10.90	....	8.90	8.60	9.15	12.25	15.40	8.50	8.50	11.20
Washington	7.78	9.80	8.60	....	8.49	8.24	...	9.40	....	8.51	8.11	9.56

*Prices do not include gage extras; †prices include gage and coating extras (based on 13.50-cent zinc), except in Birmingham (coating extra excluded); ‡includes 35-cent special bar quality extras; **¾-in. and heavier; ††as annealed; §§under ½-in.

Base quantities, 2000 to 4999 lb except as noted; Cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb, and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; ³—500 to 9999 lb; ⁴—400 to 999 lb; ⁵—4000 lb and over; ⁶—1000 to 1999 lb; ⁷—1000 lb and over; ⁷—1500 to 3999 lb; ⁸—2000 to 3999 lb; ⁹—f.o.b. local delivery in lots of 10,000 lb and over; ¹⁰—2000 lb and over



THIS INSTALLATION TREATS STEEL MILL WASTE WATER

The largest industrial waste treatment operation in the country is now at work in the new Fairless Works of United States Steel Corporation at Fairless Hills, Pennsylvania. It consists of three Walker Plants, which were supplied and installed by Dravo to clean and purify waste water.

One of these plants handles water from the blast furnaces containing flue dust. In addition to cleaning the water, the plant recovers a substantial amount of iron from this dust for re-use by the furnaces. Another plant removes such waste as acids, caustics, oils and greases from waste water received from the sheet and tin mill. The third plant handles waste water from the hot strip and tube mills.

All of these plants return water to the Delaware River cleaner than the river itself.

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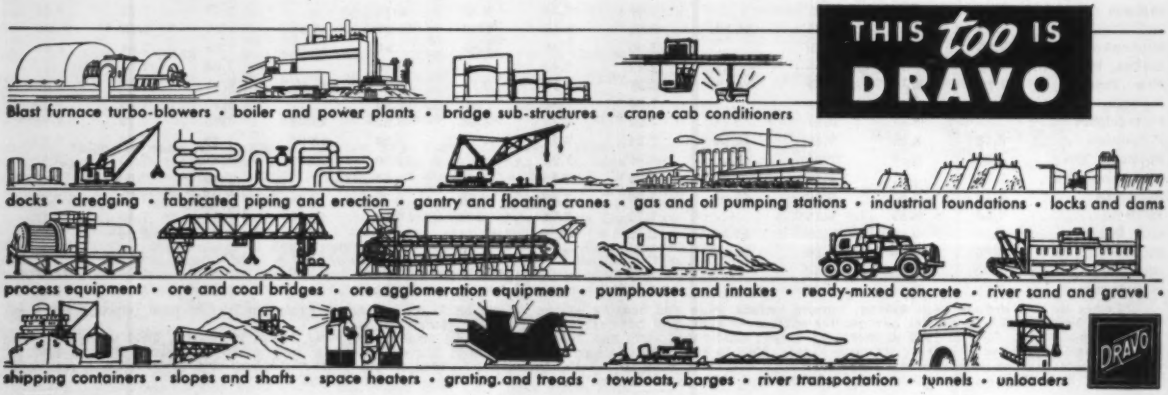
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process equipment • ore and coal bridges • ore agglomeration equipment • pumphouses and intakes • ready-mixed concrete • river sand and gravel •
shipping containers • slopes and shafts • space heaters • grating and treads • towboats, barges • river transportation • tunnels • unloaders
DRAVO

Silicon Steel Eyes Record

A fast start in 1956 and additional capacity later on in the year point to a new peak in operations. Electronics looms as an important dollar market

"WE SEE nothing but growth ahead in the production of silicon steel. The age of electricity and automation assures us of that." So say producers of this specialty steel which is a must for motors, generators and scores of other electrical apparatus.

Capacity operations for the first half of this year give this segment of the steel industry plenty of ammunition for shooting at the production record set in 1953. After getting off to a slow start last year, producers turned out 791,043 tons of both regular and grain oriented electrical steel, just 29,043 tons short of the record, according to American Iron & Steel Institute figures. In January of this year, they turned out nearly 72,900 tons (a record for that month). Production has been at that level or better ever since, industry spokesmen say.

New Capacity—Several steel companies have new facilities which will be available for this product later this year or early in 1957. Ten new annealing furnaces at U. S. Steel Corp.'s Vandergrift, Pa., Works are nearly finished. Republic Steel Corp. is raising to 23 the number of annealing furnaces at Warren, O. This represents a 300-per-cent increase in the last 10 or 15 years. In addition, the company is installing a new, 54-in. tandem mill which will be used at least part time for cold rolling silicon steel.

Allegheny Ludlum Steel Corp. is scheduling better than half of the time of its new mill at Brackenridge, Pa., for this product. Armco Steel Corp.'s new facilities at Butler, Pa., will start producing important tonnage later this year. With these and other new facilities, the industry seems destined to turn out a record tonnage this year. And still there isn't enough capacity. Producers say there will have to be more expansion in the future, but no plans are disclosed at this time.

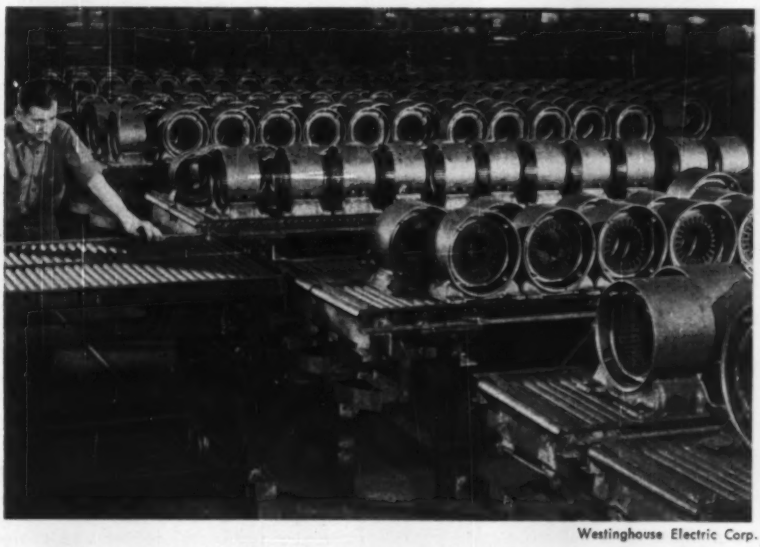
Wide Demand—Traditionally, the producers of heavy electrical equipment—generators, transformers and the like—have accounted for the bulk of the tonnage. With electric utility companies doubling their generating capacity every decade, this still represents the bread-and-butter market. It also accounts for the big boost in grain oriented silicon steel. This special product accounts for about 25 per cent of production. Most observers believe the proportion will remain at that level, although tonnage will increase as over-all production rises.

Today, integral motors (1 hp or more) are taking an extra large share of the market. These are the motors used to drive such heavy equipment as machine tools (which are being shipped at near record levels) and the rollers on steel mill runout tables. Heavy capital expenditures this year are having a good effect on electrical steel sales.

Soft Spots—Not all is rosy, however. Within the last two weeks, says one producer, sales to the refrigerator manufacturers have sloughed off. The situation is temporary, the company believes, and will not affect this year's production too much. The radio and television industry also is slow at present, but most industry spokesmen believe that the electronics field as a whole has probably the greatest potential of all. Although tonnage may not challenge the leadership of heavy generating equipment, this will be an important dollar market because of the special nature of the steels involved.

The steel shortage is no particular problem for electrical steel makers. They roll the sheet and strip on an allotment basis, and not since a year ago have they had any trouble getting the raw material to fill their schedules.

With order books just opened for the third quarter and filling fast, the only problem most producers have is getting shipments out on time. Delivery is about a month late in some grades. With demand increasing at a fast clip, there is no immediate prospect of reducing the lag.



Westinghouse Electric Corp.

Heavy demand for electric motors is one of the chief reasons that producers of silicon steel are pushing production facilities to capacity this year

Sheets, Strip . . .

Sheet & Strip Prices, Pages 143 & 144

Outlook in sheets continues to blow hot and cold, especially where automotive tonnage is concerned.

But there is little likelihood that tonnage will go begging this quarter. Consumption in many other lines is holding up well, and this demand is bolstered by protective coverage. Hedge buying doesn't augur too well for third quarter demand, but sellers see no indications of a sharp break.

Galvanized sheet supply is tightening some in the East, although shipments to agricultural areas have been slow the last month. Demand is not responding to seasonal influences. Producers expect a strong market for this product in the summer when requirements for grain bins will be heavy.

Such specialties as enameling stock and electrical sheets are moving well. A steadily increasing proportion of

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silicon steel orders specify grain-oriented silicon sheet. This trend is expected to continue for several years. Best customers for that product are producers of transformers and turbogenerators.

Inland Steel Co., Chicago, recently announced revisions in packaging extras for cold-rolled sheets (12 in. wide and narrower), galvanized sheets and enameling iron sheets. The revisions result in lower charges for some of the heavier package weight classifications and higher charges for some of the light package weight classifications. Metal packaging extras were increased. Extras for loading on skeleton platforms with skids over 4 in. high or on solid platforms also were raised.

Steel Bars . . .

Bar Prices, Page 142

Demand for hot-rolled carbon bars still exceeds supply. This is due more to protective covering than to maintenance of consumption at the high level hit a few months ago.

Mills anticipate full operations for the remainder of this quarter. A let-up in production in the third quarter is expected, reflecting seasonal influences and the disappearance of hedge buying.

The decline in demand for bars from the automotive and agricultural implement industries is offset largely by heavier demand from the construction and railroad industries.

Cold-finished steel demand is moderately active, with some improvement noted in cold-rolled alloys.

Buffalo Steel Corp. raised the price of rail steel merchant bars to $5.15 per 100 lb recently because of higher raw material costs.

Tin Plate . . .

Tin Plate Prices, Page 144

Inland Steel Co. recently announced higher prices on tin plate and tin mill products, effective Apr. 30. The mark-ups are the same as those announced earlier by other producers. Prices on electrolytic and hot dipped tin plate, black plate and terne plate will be increased 40 cents per base box for the contracting period (Apr. 30 through Oct. 31). The average increase is about 5 per cent for all tin mill products.

Kaiser Steel Corp. has established base prices on tin mill products at Fontana, Calif. C. F. Borden, vice president-sales, says it will mean savings to customers in Southern California. Sales of these products had been made on a delivered basis competitive with other steel mills.

New base prices, f.o.b. Fontana, are: Cokes (1.25 lb plate), $10.35 per base box; electrolytic (0.25 lb plate), $9.05; black plate, $8.15. These prices apply to 100-lb basis weight and are subject to published list of extras and deductions.

Strong demand continues, even though consumers have accumulated large inventories to beat the price advance. One producer is booked through the third quarter and could sell more if it were available. Full tin mill operations are expected for the year.

Wire . . .

Wire Prices, Pages 144 & 145

Youngstown Sheet & Tube Co. increased prices $2 a ton for merchant wire, effective as of Apr. 23. The annealed grade is quoted at $7.50; the galvanized grade, $8 per 100 lb, Struthers, O., in minimum carloads of 40,000 lb. Prices for less than carloads are 50 cents higher.

Wire rods are in tight supply.

A late spring continues to retard improvement in merchant wire products. Although there are openings for June on high-carbon specialties, producers are sold ahead as far as they are willing to book on low-carbon grades needed for highway strand, welded reinforcing fabric and other road and building accessories.

In the East, demand for furniture spring coils is slower. Orders for fencing are up sharply. The New York State Thruway Authority closes May 1 on three contracts for highway fence. This job is estimated at $1,416,000, including erection.

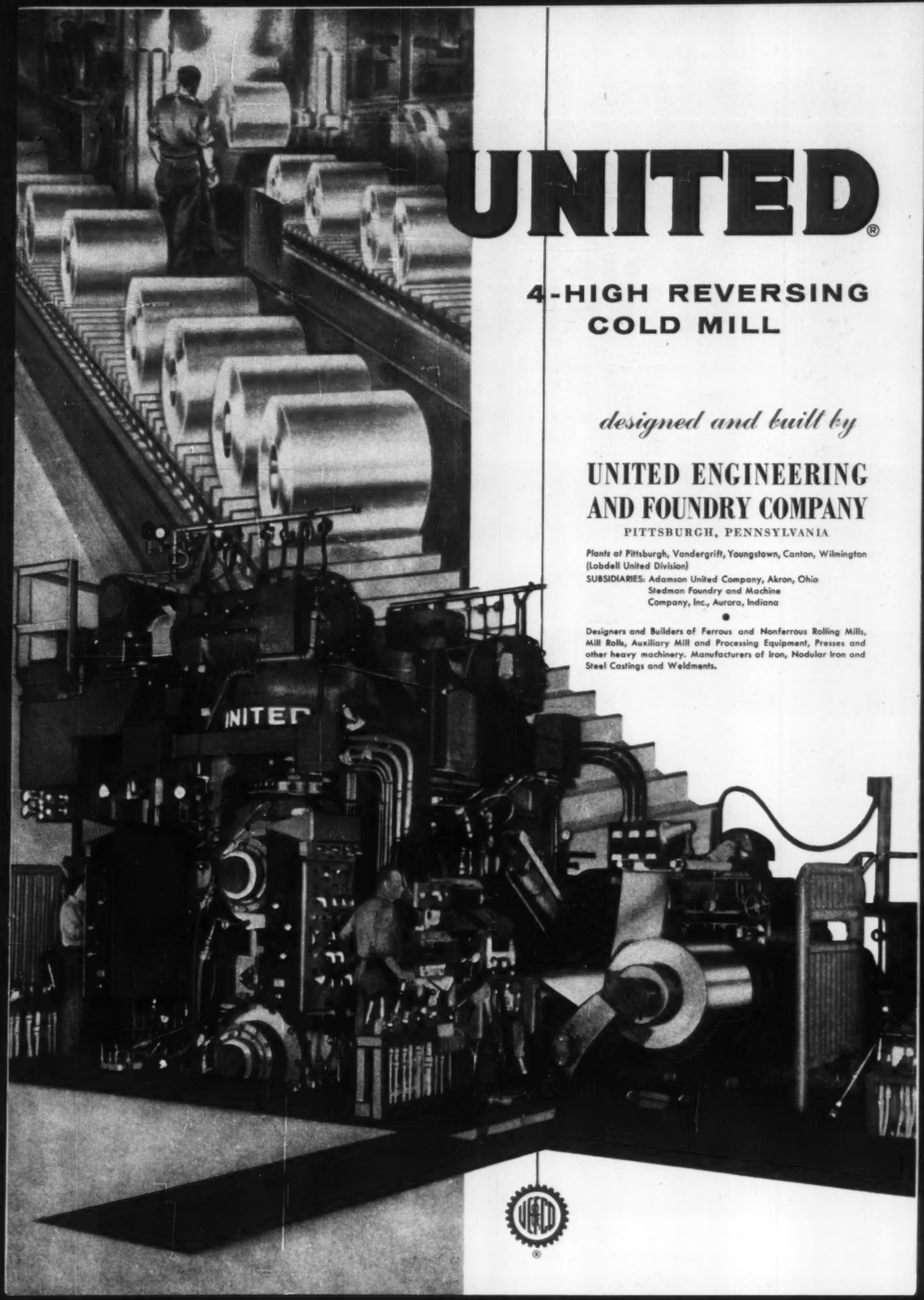
Tubular Goods . . .

Tubular Goods Prices, Page 146

Sales of tubular goods are "unbelievable," says a sales manager for a large Pittsburgh producer of specialty tubing. General industry keeps requirements strong for mechanical and pressure tubing. Several firms report demand is brisk enough to enable them to open order books for the third quarter on specialty items.

Oil country pipe production is sold out for much of the third quarter. Users of line pipe are making plans two years ahead to be certain of having enough pipe for planned projects.

The Los Angeles Metropolitan Water District has awarded a $4,505,173 contract for construction of a 10-mile pipeline. It will cover the first half of the distance from the district's softening and filtration plant near La Verne, Calif., to the Garvey reservoir in Monterey Park, Calif. Ukropina, Polich, Kral & Baker-Anderson Corp. was the successful bidder (13 firms were in competition). The pipeline (diameter, 6 ft) is described as an-



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Carbon	Manganese	Silicon
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2.00% max.	65/68%	15/17.5%
3.00% max.	65/68%	12/14.5%

VANCORAM FERROMANGANESE BRIQUETTES

are recommended for use in iron as a manganese addition agent and also as a desulphurizer. Their shape is oblong for swift identification. Their weight is approximately 3 pounds per briquette for easy handling. Their manganese content is exactly 2 pounds for simple addition without weighing.

VANCORAM SILICOMAMGANESE BRIQUETTES

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other move to meet demands for increased Colorado river water service in Southern California.

At the moment, there is little activity in the cast iron pipe market in the Northwest. While volume has not reached the high levels of last year, agencies anticipate a satisfactory total in 1956.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 142

Reinforcing bar producers are working at top capacity in the Northwest. Road construction and public works are absorbing large tonnages, and a considerable volume is involved in small awards of less than 100 tons each.

Structural Shapes . . .

Structural Shape Prices, Page 142

Deliveries of fabricated steel continue to be hampered by a shortage of plain material.

Considerable structural work is being figured, although awards are a bit scattered at the moment. One cause for delay is extended deliveries, which are forcing builders to shop around more than usual. Deliveries average a year or more, with promises depending somewhat upon the type of work.

Mills are cutting their backlog of unfilled orders, further restricting the supply of shapes. Suppliers who were more than two months behind schedule in deliveries during December and January are about one month late. Some purchasing agents think that deliveries will become current by late July or August.

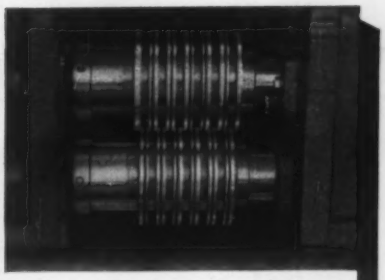
Extended delivery promises on fabricated steel are resulting in an increasing number of projects being redesigned for concrete steel construction. On Pennsylvania state bridgework, alternate designs are being supplied on spans up to 75 ft. On 300 tons of miscellaneous state work along Pennsylvania boulevard, Philadelphia, prestressed concrete will be used, including spans up to 70 ft.

Where structural steel is definitely specified, there are not nearly the usual number of bidders because of the sold-up condition of the fabricating shops. On a high school project in Upper Darby, Pa., requiring possibly 300 tons, only one fabricator submitted a bid. Normally, there would have been a dozen or so bidders.

In the Pacific Northwest, several sizable structural contracts are pending, including two bridge approaches at Portland, Oreg., involving 4300 tons.

In taking bids on bridges in the Calumet Skyway road project, the city of Chicago is finding that low

COWLES
SLITTING KNIVES



Cut costs 3 ways

Cowles knives reduce set-up time. They are made so accurately they can be assembled on the arbor without shimming. Cowles knives stay on the job longer;— they reduce down-time for re-grinding; and produce straight edged strip with minimum burr avoiding tie-ups in blanking operations.

For maximum economy and satisfaction order your knives and spacers from Cowles, world's largest manufacturer of rotary slitting knives. Prompt delivery. Complete range of sizes and analyses for slitting high and low carbon steels, stainless, alloys, silicon or non-ferrous metals.

Engineering Assistance On Any Slitting Job!

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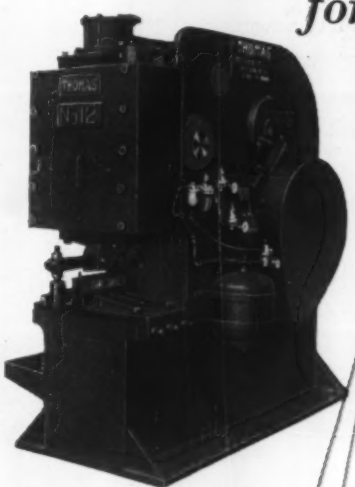
Specializing in the Manufacture of

ROTARY SLITTING KNIVES • SPACING COLLARS • GANG TOOLS • EDGING ROLLS • CUT-OFF KNIVES • SEAM GUIDE ROLL FINS • SEAM GUIDES • WIRE DRAWING TOOLS • STANDARD AND SPECIALLY ENGINEERED TOOLS FOR ALL FERROUS AND NON-FERROUS PROCESSING, TRIMMING AND FORMING REQUIREMENTS.

THE TREND IS TO THOMAS *for*

production cutting of bars or angles



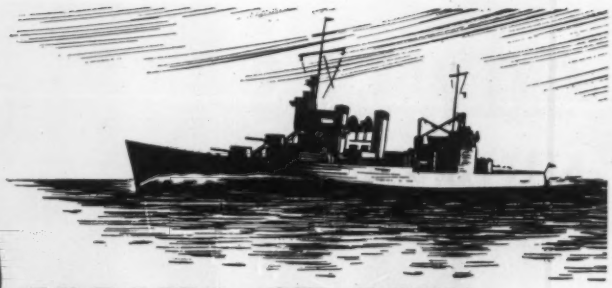
• *Machine is shown tooled for flats. Modern Thomas design makes this machine a compact, space-saving, self-contained unit for shearing or punching.*

This all-steel Thomas machine is available in capacities of 50 through 600 tons. It can be supplied with tools for shearing flats, rounds or angles, or fitted with punching tools.

THOMAS
MACHINE MANUFACTURING CO.
PITTSBURGH 33, PA.

Punches • Shears • Presses • Spacing Tables • Benders

54

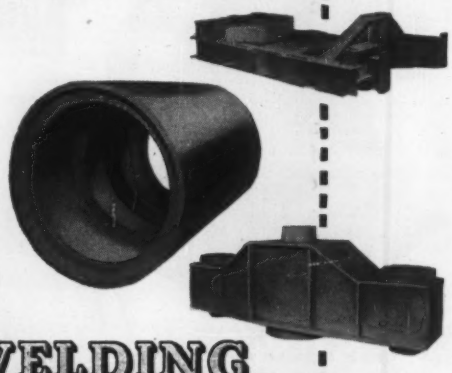


NAVY CRANE RIDES HIGH on ACME Weldments

220 feet below the hook is quite a reach. When the Navy needed a portal crane that big to swing heavy sections on to vessels under construction, the Derrick & Hoist Corporation of Long Island City designed and built a diesel-electric giant with the right reach and a capacity of 50 long tons. *Carrying this big load are all-welded components fabricated by Acme Welding.*

ACME weldments were chosen in place of castings to assure *greater strength, rigidity,* and complete absence of flaws . . . to eliminate pattern cost . . . to provide greater design flexibility. If these advantages of welded fabrication are important to your product —especially when combined with exact adherence to your specifications—why not investigate Acme weldments *today*.

Send us your blueprints for a prompt quotation and ask for our informative booklet, "The FACTS about WELDMENTS and CASTINGS."



Acme WELDING

DIVISION of THE UNITED TOOL & DIE CO.

1030 New Britain Ave. • West Hartford 10, Conn.

STEEL • STAINLESS STEEL • EVERDUR • ALLOYS • CUSTOM FABRICATORS of PRESSURE VESSELS • MACHINERY BASES and COMPONENTS • WELDED ASSEMBLIES • STEEL TANKS

bids range from 11 to 15 per cent over engineering estimates. City purchasing officials explain that the high bids reflect increased steel costs since the estimates were prepared. So the city plans to hurry contracts as much as possible. Some 50 contracts are involved, and awards may be placed soon at the rate of two a week.

Plates . . .

Plate Prices, Page 142

Stringency in plates is more acute than ever. Virtually all plate buying segments of industry are pressing for tonnage, and most mills are steadily losing ground trying to keep up with commitments.

More light gage plate tonnage is being scheduled on sheet and strip mills. This is expected to help the railroad car builders, but it has not materially improved the supply available to miscellaneous plate consumers. Any substantial bulge in automotive buying would soon displace plate schedules on these mills.

Some producers which have opened books for the third quarter are for all practical purposes out of the market. Customers already are clamoring for more tonnage than allotments provide. Some mills haven't acted for third quarter, but indicate that when they do it will be on a month-to-month basis. They believe they can keep better control of their commitments that way.

A Pittsburgh producer says: "We're going to have a heavy summer, with a busy railroad program, a strong season for line pipe and a busy construction season."

Some car shops again are threatened with a suspension of operations primarily because of a scarcity of plates. Prospects for the fall are not too encouraging, with one eastern mill expected to suspend production of sheared plate for a few weeks while adjustments are being made to bring in expanded facilities. Maintenance needs also will cut into the ability of plate mills to produce. Mills have been pushed to their limit for many months, and repairs will have to be made during the summer.

Plate shops in New England are getting shipments reasonably close to promise, but are unable to place additional tonnage beyond established volume for increased production or for inventory. Small tank requirements are seasonally larger.

With plate demand highly active, the outlook is strong for the remainder of the year. Production may ease in the third quarter, but if so,

31 experts collaborated

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*Add 30 cents to cover state sales tax on orders for delivery in Ohio.

Ores

Lake Superior Iron Ore

(Prices effective for the 1956 shipping season, gross ton, 51.50% iron natural, rail of vessel, lower lake ports)

Old range bessemer	$11.25
Old range nonbessemer	11.10
Mesabi bessemer	11.00
Mesabi nonbessemer	10.85
Open-hearth lump	12.10
High phos.	10.85

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Dec. 1, 1955, and increases or decreases after such date are for seller's account.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60-68%	20.00
N. African hematite (spot)	nom. 18.00-20.00
Brazilian iron ore, 68-69% 13.00c, f.o.b. Victoria.	

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$33.00-$35.50
Domestic, scheelite, mine	63.00

Manganese Ore

Mn 48%, delivery within six months, $1.15 nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account; 46-47%, $1.05 nom.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and African

48% 2.8:1	nom. $45.00-$50.00
48% 3:1	42.00-44.00
48% no ratio	34.00

South African Transvaal

44% no ratio	$19.00-$20.00
48% no ratio	33.00-35.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of mo content, mines, unpacked	$1.10

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.60-$3.85
60-65%	3.85-4.00

Vanadium Ore

Cents per lb V_2O_5 content, deld. mills	
Domestic	31.00

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $122; Salina, Pa., $127; Niles, O., $133.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Pa., New Savage, Md., St. Louis, $150.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Windham, Portsmouth, O., Hawstone, Pa., $128; Warren, Niles, O., Hays, Pa., $133; Morrisville, Pa., $131.50; E. Chicago, Ind., Joliet, Rockdale, Ill., $138; Lehigh, Utah, $144; Los Angeles, $151.

Super Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $145; Morrisville, Pa., $148; Joliet, Ill., $151; Curtner, Calif., $163.

Semisilica Brick (per 1000)

Clearfield, Pa., $139; Philadelphia, $124; Woodbridge, N. J., $122.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Pa., Mexico, Vandalia, Mo., $88.50; Wellsville, O., $92.50; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $194; Danville, Ill., $197; Philadelphia, Clearfield, Pa., $201.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $241; Danville, Ill., $244; Philadelphia, Clearfield, Pa., $248.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $279; Danville, Ill., $281; Clearfield, Pa., Philadelphia, $286.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $157; Clearfield, Pa., $158.50; St. Louis, $169.30.

Nozzles (per 1000)

Reesdale, Pa., $253.70; Johnstown, Pa., $259.20; Clearfield, Pa., $259.40; St. Louis, $259.45; Bridgeburg, Pa., $258.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $196; Clearfield, Pa., $198; St. Louis, $195.80.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $15; Thornton, McCook, Ill., $15.60; Dolly Siding, Bonne Terre, Mo., $14.

Magnesite (per net ton)

Domestic, dead-burned, bulk, ½-in. grains with fines: Chewelah, Wash., $40; Luning, Nev., $40. ⅜-in. grains with fines: Baltimore, $66.40.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$13.75-14.50
Connellsville, foundry	16.00-17.00

Oven Foundry Coke

Birmingham, ovens	$25.65
Cincinnati, deld.	30.58
Buffalo, ovens	27.50
Buffalo, deld.	28.75
Camden, N. J., ovens	26.50
Chicago, ovens	27.00
Chicago, deld.	28.50
Detroit, ovens	27.50
Detroit, deld.	28.50
Pontiac, deld.	29.06
Saginaw, deld.	30.58
Erie, Pa., ovens	27.50
Everett, Mass., ovens	
New England, deld.	*28.55
Indianapolis, ovens	26.75
Ironton, O., ovens	26.00
Cincinnati, deld.	28.59
Kearny, N. J., ovens	26.75
Lone Star, Tex., ovens	19.50
Milwaukee, ovens	27.50
Neville Island, (Pittsburgh) Pa., ovens	26.25
Painesville, O., ovens	27.50
Cleveland, deld.	29.43
Philadelphia, ovens	26.50
St. Louis, ovens	28.50
St. Paul, ovens	26.50
Swedeland, Pa.,, ovens	26.50
Terre Haute, Ind., ovens	26.75

*Or within $4.55 freight zone from works.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulphate	$42-$45
Birmingham area	42.00†

†With port equalization against imports.

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-$39; 70%, $35-$36; 60%, $31-$32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Electrodes

Threaded with nipple, unboxed, f.o.b. plant

GRAPHITE

Diam (Inches)	Length	Per 100 lb
2	24	$52.50
2½	30	33.75
3	40	32.00
4	40	30.25
5⅛	40	30.00
6	60	* 27.25
7	60	26.75
8, 9, 10	60	24.25
12	72	27.25
14	60	23.50
16	72	22.50
17	60	23.00
18	72	22.50
20	72	22.25

CARBON

8	60	12.10
10	60	11.80
12	60	11.75
14	60	11.70
14	72	10.85
17	60	10.75
17	72	10.35
20	84	10.30
20	90	10.10
24	72, 84	10.30
24	96	10.05
30	84	10.20
40, 35	110	9.90
40	100	9.90

it will not be due to lack of inquiry. Hot weather and vacations are expected to retard output to some extent.

Pig Iron . . .

Pig Iron Prices, Page 147

A record 7,149,443 tons of pig iron and ferroalloys were produced in this country's blast furnaces during March, says the American Iron & Steel Institute, New York. The previous monthly high of 7,049,564 tons was reached in January. Production came to 6,602,817 tons in February. Output was 6,463,951 tons in March, 1955.

During the first three months of this year, an all-time quarterly record was set. Total blast furnace production was 20,801,824 tons, more than 184,000 tons over the mark of the prior record period—the last three months of 1955.

Production was maintained at 98.5 per cent of capacity in March and 97.6 per cent in the first quarter of this year.

Protective buying of pig iron is going on for the third time this year. Buyers hedged early in the year in anticipation of an advance that didn't materialize; later in the first quarter they anticipated an increase that came off; and now they are looking for a hike that undoubtedly will develop after steel labor negotiations have been settled. The possibility of a strike within the industry is also a buying influence at this time.

There is little or no protective buying of foundry coke. Savings through stocking aren't what they are for iron. Foundry coke is cheaper and a smaller tonnage is required (an average of 1 ton of coke is used in the production of 7 or 8 tons of metal). Coke does not withstand storage as well as iron. And production is less likely to be affected by a steel strike. Some producers have contracts with other than the steelworkers' union.

Merchant iron is moving well, with little variation in volume over the past month. Most foundries are operating close to 80 per cent of capacity.

The first change in pig iron production in the Buffalo district in many months came last week when Hanna Furnace shut down one of its blast furnaces for a relining job. The work may be completed in June.

U. S. Steel Corp. will build a sintering plant at Houseville, Pa., to process about 15,000 tons of domestic and foreign ore daily for the corporation's plants in the Monongahela valley. Steelmakers are taking ad-

(*Please turn to page* 160)

From coast-to-coast, A. P. GREEN warehouse stocks are available for immediate delivery to your plant . . .

You Lower Your Capital Investment . . . Your capital is not tied up in warehouse space.

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You Maintain Steady Production . . . With less down time. A. P. Green warehouse stocks are complete and are available for immediate delivery.

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Current Ferroalloy Quotations

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $96.50; 19-21% Mn, 1-3% Si, $94; 16-19% Mn, $92.

Standard Ferromanganese: (Mn 74-76%, C 7% approx.) **Base price per net ton $215. Duquesne, Johnstown, Sheridan, Pa.; Philo, O.; Tacoma, Wash.; Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg.** Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $223 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max. 0.07% C, 31.95c per lb of contained Mn, carload packed 33c, ton lots 34.5c, less ton 35.7c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.30% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk 22.85c per lb of contained Mn, packed, carload 23.9c, ton lot 25.5c, less ton 26.7c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lots 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 31.5c; 2000 lb to min carload, 33.5c; 250 lb to 1999 lb, 35.5c; less than 250 lb, 36.5c. **Preminum for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight alowed.**

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12c per lb of alloy. Packed, c.l. 13c, ton 13.45c, less ton 14.45c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lots 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lots $1.35, less ton $1.37 f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%. Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk 26.25c per lb of contained Cr; c.l. packed 27.5c, ton lot 29.25c, less ton 30.65c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 31.75c per lb contained Cr, 0.02% max 38.50c, 0.03% max 38c, 0.06% max 36.50c, 0.1% max 36c, 0.15% max 35.75c, 0.2% max 35.50c, 0.5% max 35.25c, 1.0% max 34c, 1.5% max 33.85c, 2.0% max 33.75c. Ton lot, add 3.1c, less ton add 4.8c. Carload packed add 1.45c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l. 2 in. x D, bulk 27.4c per lb contained Cr. Packed. c.l. 28.7c, ton 30.5c, less ton 32c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, Low-Carbon: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed 8 M x D, 19.6c per lb of alloy, ton lot 20.85c; less ton lot, 22.05c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 39.05c per lb of contained Cr; 1" x down, bulk 39.8c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis. Fe 0.2 max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.25 per lb, ton lots $1.27, less ton lots $1.29. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.10 per lb of contained V. Delivered. Spot, add 10c. **Special Grade** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.20. **High Speed Grade** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.30.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lots, packed, $1.33 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 12.75c per lb of contained Si. Packed, c.l. 14.85c, ton lot 16.3c, less ton 17.95c. F.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.2c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 14.5c per pound contained silicon. Packed, c.l. 16.2c, ton lots, 18c; less ton, 19.35c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 15.4c per lb of contained Si. Packed, c.l. 17.05c, ton lot 18.7c, less ton 19.95c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 18.5c per lb of contained Si. Packed, c.l. 19.95c, ton lot 21.35c, less ton 22.4c. Delivered. Spot, add 0.25c.

Silicon Metal: (Min 98% Si, 0.75% max Fe, 0.07 max Ca). C.l. lump, bulk, 20.5c per lb of Si. Packed, c.l. 21.95c, ton lot 23.25c, less ton 24.25c. Add 0.5c for max 0.03 Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lots packed 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 8.5c per lb of alloy. Packed, c.l. 9.5c, ton lot 10.65c, less ton 11.5c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 26.25c per lb of alloy, ton lot 27.4c, less ton 28.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per pound; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). $5.25 per lb contained B, delivered to destination.

Bortam: (B 1.5%-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 22c per lb of alloy, carload packed 23.05c, ton lot 24.95c, less ton 25.95c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 21.5c per lb of alloy, carload packed 22.95c, ton lot 25.25c, less ton 26.75c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3¾ lb each and containing 2 lb of Cr). Contract, carload, bulk, 16.95c per lb of briquet, carload packed in box pallets 17.15c, in bags 17.85c; 3000 lb to c.l. in box pallets 18.35c; 2000 lb to c.l. in bags, 19.05c; less than 2000 lb in bags 19.95c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing 2 lb of Mn). Contract, carload, bulk 13c per lb of briquet, c.l. packed, pallets 13.2c, bags 14c; 3000 lb to c.l., pallets 14.4c; 2000 lb to c.l. bags, 15.2c, less ton 16.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 13.55c per lb of briquet, c.l. packed, pallets, 13.75c; bags 14.55c, 3000 lb to c.l., pallets, 14.95c; 2000 lb to c.l., bags, 15.75c; less ton 16.65c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing 2 lb of Si). Contract, carload, bulk 7.15c per lb of briquet; packed, pallets, 7.35c; bags, 8.15c; 3000 lb to c.l., pallets, 8.95c; 2000 lb to c.l. bags 9.75c; less ton 10.65c. Delivered. Spot, add 0.25c.

(Small size—Weighing approx. 2½ lb and containing 1 lb of Si). Carload, bulk 7.3c. Packed, pallets 7.5c; bags 8.30c; 3000 lb to c.l. pallets 9.1c; 2000 lb to c.l. bags 9.9c; less ton 10.8c. Delivered. Add 0.25c for notching. small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) $1.30 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%), 5000 lb W or more $3.45 per lb of contained W; 2000 lb W to 5000 lb W, $3.55; less than 2000 lb W, $3.67. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min C 0.30% max). Ton lots, 2" x D, $4.65 per lb of contained Cb plus Ta, delivered; less ton lots $4.70.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.) Contract, c.l. packed ½ in. x 12 M, 18.5c per lb of alloy, ton lots 19.65c, less ton 20.9c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 18.5c per lb of alloy, ton lots 19.65c; less ton lots 20.9c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

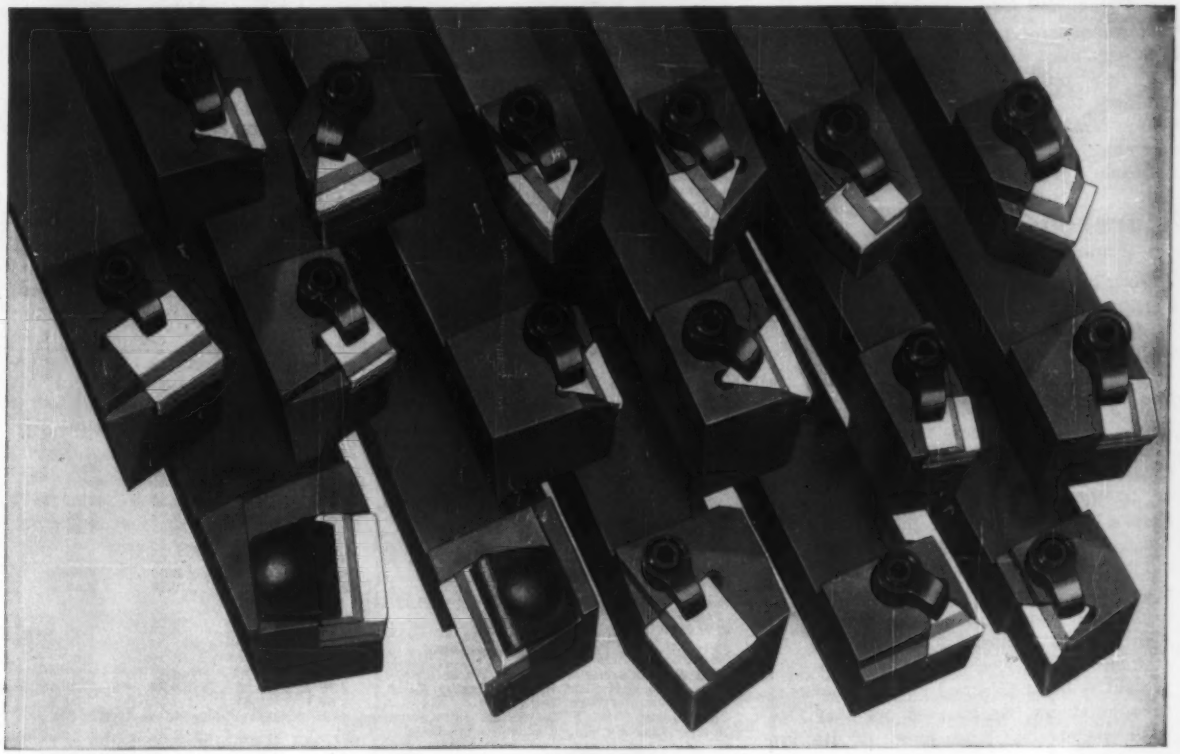
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 17.2c per lb of alloy; ton lots 18.7c; less ton lots 19.95c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Siminal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 17.50c. Packed c.l. 18.50c, 200 lb to c.l. 19.50c, less than 2000 lb 20c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base; carload, f.o.b. sellers' works, Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb containers, f.o.b. Langeloth, Pa., $1.54 in all sizes except powdered which is $1.66; Washington, Pa., furnace, any quantity $1.46.

Technical Molybdic-Oxide: Per lb contained Mo, f.o.b. Langeloth, Pa.; $1.31 in cans; in bags, $1.30, f.o.b. Langeloth, Pa.; $1.24, Washington, Pa.



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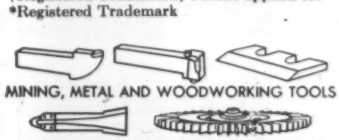

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(*Concluded from page* 156)

vantage of any possible method of boosting blast furnace production. Pig iron output in this area is strained to the limits because of heavy demand for finished products and castings, together with steadily increasing price of scrap.

Warehouse . . .

Warehouse Prices, Page 147

Distributors have not noted a significant seasonal increase in sales of such products as wire and nails. Some are disappointed by the lack of a strong upswing in construction items which usually comes at this time.

Tightness prevails in sheets and bars, but it doesn't begin to measure up to the stringency in plates and shapes, particularly wide flange sections. WF sections are being moved out as fast as they are received from the mills. Substantial inquiry is being turned away.

In the East, demand for alloys and stainless is heavier, including some protective buying. One leading structural producer has blanked out May with warehouses and most of its structural fabricating shop customers.

Iron Ore . . .

Iron Ore Prices, Page 156

Consumption of Lake Superior iron ore in the U. S. increased 14.7 per cent in the first quarter, compared with the like 1955 period. Consumption amounted to 22,322,958 tons in the first three months of this year, against 19,530,986 tons a year ago (in Canada, 1,077,575 tons, against 1,016,894), says the Lake Superior Iron Ore Association. The total for March was 8,007,692 tons, against 7,481,146 tons for March, 1955.

As of Apr. 1, stocks of Lake Superior iron ore in the U. S. amounted to 20,302,984 tons, compared with 27,865,498 tons a month earlier and 22,710,522 tons a year earlier. Stocks at Canadian furnaces had dropped to 980,377 tons on Apr. 1 from 1,307,204 tons on Mar. 1.

There was no change in the number of blast furnaces in operation as of Apr. 1, holding at 184 in this country and ten in Canada, leaving eight idle here and three in Canada.

Steel Import Prices

(Base per 100 lb, landed, duty paid. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A-305	$6.80	$6.80	$6.80	$7.20
Bar Size Angles	6.80	6.80	6.80	7.20
Structural Angles	6.80	6.80	6.80	7.20
I-Beams	*7.20*	*7.20*	*7.20*	*7.60*
Wide Flange Beams	7.00	7.00	7.00	7.40
Plates	8.50	8.50	8.50	8.90
Sheets, H.R.	9.00	9.00	9.00	9.40
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	*28.63*	*28.63*	*28.63*	*30.46*
Barbed Wire (†)	6.10	6.10	6.10	6.45
Merchant Bars	*6.80*	*6.80*	*6.80*	*7.20*
Hot-Rolled Bands	7.10*	7.10*	7.10*	7.50*
Wire Rods, Thomas Commercial No. 5	*6.40*	*6.40*	*6.40*	*6.80*
Wire Rods, O-H Cold Heading Quality No. 5	*6.90*	*6.90*	*6.90*	*7.30*
Bright Common Wire Nails	7.50	7.50	7.50	7.90

Oil Country Pipe: Prices on all sizes equalized with Pittsburgh plus barge freight to New Orleans and Houston, where available.

*Nominal. †Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier

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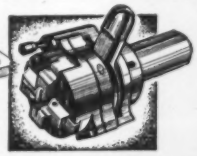

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Scrap . . .

Scrap Prices, Page 162

Pittsburgh—Higher prices paid for No. 1 heavy melting scrap in the Valley and in other areas on the fringe of this district continue to drive up the price which mills here must pay to get good scrap. Although there have been no large purchases by steelmakers of the No. 1 grade, trade sources say mills would have to pay at least $56 a ton if they entered the market now. No. 2 heavy melting and No. 2 bundles are less active here, and the spread between No. 1 and No. 2 steel is widening.

The shortage of grades regarded as "good quality scrap" continues to force prices upward on turnings, borings and electric furnace bundles. After a quiet week as far as major purchases were concerned, a major buyer of scrap late last week was reported ready to enter the market soon.

Philadelphia—Open-hearth scrap is coming out more freely, but, so far, it hasn't resulted in a reduction in prices. Mill inventories have increased slightly, and the next week or so should afford a market test.

Meanwhile, little export scrap is being shipped. One ship is being loaded for departure early in May.

The only price revisions are increases in couplers, springs and wheels to $62-$63, delivered; in No. 1 cupola cast, to $51-$52; and in malleable, to $70.

Buffalo—A leveling process is apparently under way in the scrap market here. Dealers are shipping against old orders and are awaiting the placement of new mill business around the first of the month.

The high rate of steel mill operations is providing a good market for scrap, although opening of the lake shipping season took some of the pressure off local dealers. Mills are bringing in scrap from upper lake ports.

No. 1 heavy melting steel continues to be shipped from Buffalo to Youngstown where it commands a higher price than is paid locally. Demand for cast scrap is strong due to heavy foundry requirements. Blast furnace scrap is not finding as ready a market at the moment as open-hearth grades.

New York—Brokers' buying prices are steady except for an advance of $1 in No. 1 cupola cast to $43-$44. Despite a freer movement of scrap, the undertone is still fairly strong.

Boston—Following an increase in prices of No. 2 heavy melting steel scrap to $36.50-$37, the market leveled off at close to the year's high. Brokers are paying $48, f.o.b. shipping point, for No. 1 heavy melting and bundles. This price is bringing out tonnage in sufficient volume to increase shipments against old orders for eastern Pennsylvania and west of Buffalo. No. 2 bundles rose to $36.50, shipping point, an advance of $2 a ton. Usual differentials between heavy melting grades, including bundles, are distorted by the wide range.

Cincinnati—Last week was quiet. No significant new orders were placed. Some brokers see the possibility of a slight weakness at the beginning of May when new orders are placed by producers. Meanwhile, the complex situation arising from the oncoming "strike season" will pose new problems.

Chicago—Limited scrap buying by mills is tending to hold the market in check here. However, there is considerable firmness in current prices. One exception is No. 2 heavy melting steel which is off $1 a ton on consumer purchasing. A mill which has been out of the market for several weeks is expected to buy shortly, and this should serve to re-establish the market.

There are reports of mills offering $1 to $2 a ton below present prices for some dealer grades, but brokers haven't been interested. Full capacity steel production rails into mill scrap inventories rapidly and exerts a bullish influence.

St. Louis—Scrap prices, soaring until last week, showed a minor break in a few categories. Considerable backing and filling is evident. It is believed the peak has been reached in this district, but it is too early to determine whether the high market is cracking. A lot of scrap is moving.

Most of the prices held firm, but

(*Please turn to page* 164)

Steel Ingot Output Maintains Record Pace

Period	OPEN HEARTH Net tons	OPEN HEARTH Per cent of capacity	OPEN HEARTH ‡Index	BESSEMER Net tons	BESSEMER Per cent of capacity	BESSEMER ‡Index	ELECTRIC Net tons	ELECTRIC Per cent of capacity	ELECTRIC ‡Index	TOTAL Net tons	TOTAL Per cent of capacity	TOTAL ‡Index	Calculated weekly production (Net tons)
1956													
January	9,676,151	101.4	151.1	323,235	79.5	92.0	828,845	86.6	232.1	10,828,231	99.3	152.2	2,444,296
*February	9,043,064	101.3	150.9	296,543	78.0	90.2	779,388	87.1	233.3	10,118,995	99.2	152.1	2,444,202
†March	9,778,000	102.5	152.7	310,000	76.2	88.2	833,000	87.1	233.2	10,921,000	100.2	153.5	2,465,000
†1st Quarter	28,497,215	101.8	151.6	929,778	77.9	90.1	2,441,233	87.0	232.8	31,868,226	99.6	152.6	2,451,402
1955													
January	8,054,345	86.0	125.7	199,229	49.0	56.7	584,162	63.6	163.6	8,837,736	82.7	124.2	1,994,974
February	7,734,884	91.5	133.7	197,091	53.7	62.1	564,959	68.1	175.1	8,496,934	88.0	132.2	2,124,233
March	9,060,026	96.7	141.4	255,493	62.8	72.7	666,235	72.6	186.5	9,981,754	93.4	140.3	2,253,281
1st Quarter	24,849,255	91.4	133.6	651,813	55.2	63.9	1,815,356	68.1	175.1	27,316,424	88.0	132.3	2,124,139
April	8,858,549	97.7	142.9	275,069	69.8	80.9	681,477	76.6	197.2	9,815,095	94.8	142.6	2,287,901
May	9,307,291	99.4	145.3	305,347	75.1	86.9	715,678	77.9	200.4	10,328,316	96.6	145.2	2,331,448
June	8,764,430	96.6	141.4	283,544	72.0	83.4	698,493	78.6	202.1	9,746,467	94.1	141.6	2,271,904
2nd Quarter	26,930,270	97.9	143.2	863,960	72.3	83.8	2,095,648	77.7	199.9	29,889,878	95.2	143.1	2,297,454
1st 6 Months	51,779,525	94.7	138.5	1,515,773	63.8	73.9	3,911,004	72.9	187.5	57,206,302	91.6	137.7	2,211,299
July	8,232,535	88.1	128.5	268,348	66.1	76.4	600,063	65.5	168.0	9,100,946	85.3	127.9	2,059,038
August	8,600,612	91.8	134.3	298,972	73.5	85.1	694,000	75.7	194.6	9,594,545	89.7	134.9	2,165,812
September	8,829,266	97.6	142.4	307,171	78.2	90.3	745,888	84.1	215.8	9,882,325	95.7	143.5	2,308,954
3rd Quarter	25,662,413	92.4	135.0	874,491	72.6	83.9	2,040,912	75.0	192.5	28,577,816	90.2	135.4	2,176,528
9 Months	77,441,938	93.9	137.3	2,390,264	66.8	77.2	5,951,916	73.6	189.2	85,784,118	91.1	136.9	2,199,593
October	9,369,704	100.0	146.3	330,150	81.2	94.0	801,196	87.3	224.3	10,501,050	98.2	147.6	2,370,440
November	9,141,244	100.8	147.5	306,674	77.9	90.2	799,480	89.9	231.3	10,247,398	99.0	148.8	2,388,671
December	9,406,531	100.7	146.9	292,429	72.1	83.2	804,559	87.8	225.3	10,503,519	98.5	147.6	2,376,362
4th Quarter	27,917,479	100.5	146.9	929,253	77.0	89.1	2,405,235	88.3	226.9	31,251,967	98.6	148.0	2,378,384
Last Half	53,579,892	96.5	140.9	1,803,744	74.8	86.5	4,446,147	81.7	209.7	59,829,783	94.4	141.7	2,277,495
Total 1955	105,359,417	95.6	139.7	3,319,517	69.3	80.2	8,357,151	77.3	198.7	117,036,085	93.0	139.7	2,244,651

Note—The percentages of capacity operated are calculated on weekly capacities in 1956 of 2,154,144 net tons open hearth, 91,810 net tons bessemer and 215,939 net tons electric ingots and steel for castings, total 2,461,893 net tons; based on annual capacities as of Jan. 1, 1956, as follows: Open hearth 112,317,040 net tons, bessemer 4,787,000 net tons, electric 11,259,050 net tons, total 128,363,090 net tons.

Note—The percentages of capacity operated are calculated on weekly capacities in 1955 of 2,114,196 net tons open hearth, 91,810 net tons bessemer and 207,272 net tons electric ingots and steel for castings, total 2,413,278 net tons; based on annual capacities as of Jan. 1, 1955, as follows: Open hearth 110,234,160 net tons, bessemer 4,787,000 net tons, electric 10,807,150 net tons, total 125,828,310 net tons.

*Revised. †Preliminary figures, subject to revision. ‡Index of production based on average weekly production of the three years 1947-1948-1949.

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Apri. 25	$55.33
Apr. 18	55.00
Mar. Avg.	50.21
Apr. 1955	36.73
Apr. 1951	44.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania

PITTSBURGH

No. 1 heavy melting	*55.00-56.00*
No. 2 heavy melting	47.00-48.00
No. 1 bundles	*55.00-56.00*
No. 2 bundles	45.00-46.00
No. 1 busheling	*55.00-56.00*
Machine shop turnings	*40.00-41.00*
Mixed borings, turnings	*40.00-41.00*
Short shovel turnings	*43.00-44.00*
Cast iron borings	*43.00-44.00*
Cut structurals, 3 ft lengths	64.00-65.00
Heavy turnings	*50.00-51.00*
Punchings & plate scrap	64.00-65.00
Electric furnace bundles	*62.00-63.00*

Cast Iron Grades

No. 1 cupola	52.00-53.00
Charging box cast	48.00-49.00
Heavy breakable cast	48.00-49.00
Unstripped motor blocks	35.00-36.00
No. 1 machinery cast	57.00-58.00

Railroad Scrap

No. 1 R.R. heavy melt.	65.00-66.00
Rails, 2 ft and under	74.00-75.00
Rails, 18 in. and under	75.00-76.00
Rails, random lengths	69.00-70.00
Railroad specialties	69.00-70.00

Stainless Steel Scrap

18-8 bundles & solids	345.00-355.00
18-8 turnings	240.00-250.00
430 bundles & solids	110.00-120.00
430 turnings	60.00-65.00

CLEVELAND

No. 1 heavy melting	*56.00-57.00*
No. 2 heavy melting	*49.00-50.00*
No. 1 bundles	*56.00-57.00*
No. 2 bundles	*43.00-44.00*
No. 1 busheling	*56.00-57.00*
Machine shop turnings	32.00-33.00
Mixed borings, turnings	36.00-37.00
Short shovel turnings	36.00-37.00
Cast iron borings	36.00-37.00
Low phos.	*58.00-59.00*
Cut structural plates 2 ft and under	*61.00-62.00*
Alloy free, short shovel turnings	*36.00-37.00*
Electric furnace bundles	58.00-59.00

Cast Iron Grades

No. 1 cupola	*57.50-58.50*
Charging box cast	*49.00-50.00*
Stove plate	*54.00-55.00*
Heavy breakable cast	*48.00-49.00*
Unstripped motor blocks	*33.00-34.00*
Brake shoes	*44.00-45.00*
Clean auto cast	*57.50-58.50*
Burnt cast	*44.00-45.00*
Drop broken machinery	*58.00-59.00*

Railroad Scrap

No. 1 R.R. heavy melt.	60.00-61.00
R.R. malleable	65.00-66.00
Rails, 2 ft and under	*73.50-74.50*
Rails, 18 in. and under	*72.00-73.00*
Rails, random lengths	*68.00-69.00*
Cast steel	*61.00-62.00*
Railroad specialties	62.00-63.00
Uncut tires	63.00-64.00
Angles, splice bars	68.00-69.00
Rails, rerolling	71.00-72.00

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	345.00-355.00
18-8 turnings	205.00-215.00
430 clips, bundles, solids	105.00-115.00
430 turnings	55.00-65.00

YOUNGSTOWN

No. 1 heavy melting	*59.00-60.00*
No. 2 heavy melting	*46.00-47.00*
No. 1 bundles	*59.00-60.00*
No. 2 bundles	*43.00-44.00*
No. 1 busheling	*59.00-60.00*
Machine shop turnings	33.00-34.00
Short shovel turnings	37.00-38.00
Cast iron borings	37.00-38.00
Low phos.	*60.00-61.00*
Electric furnace bundles	*58.00-59.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*64.00-65.00*

CHICAGO

No. 1 heavy melting	53.00-56.00
No. 2 heavy melting	*43.00-44.00*
No. 1 factory bundles	57.00-58.00
No. 1 dealer bundles	53.00-54.00
No. 2 bundles	41.00-42.00
No. 1 busheling	53.00-56.00
Machine shop turnings	31.00-32.00
Mixed borings, turnings	33.00-34.00
Short shovel turnings	33.00-34.00
Cast iron borings	33.00-34.00
Cut structurals, 3 ft	57.00-58.00
Punchings & plate scrap	58.00-59.00

Cast Iron Grades

No. 1 cupola	*52.00-53.00*
Stove plate	*46.00-47.00*
Unstripped motor blocks	40.00-41.00
Clean auto cast	55.00-56.00
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	57.00-58.00
R.R. malleable	63.00-64.00
Rails, 2 ft and under	71.00-72.00
Rails, 18 in. and under	72.00-73.00
Angles, splice bars	66.00-67.00
Rails, rerolling	72.00-73.00

Stainless Steel Scrap

18-8 bundles & solids	*380.00-395.00*
18-8 turnings	*270.00-280.00*
430 bundles & solids	105.00-110.00
430 turnings	55.00-60.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	54.00
No. 2 heavy melting	46.00
No. 1 bundles	54.00
No. 2 bundles	37.00
No. 1 busheling	54.00
Machine shop turnings	24.00
Mixed borings, turnings	24.00
Short shovel turnings	28.00
Punchings & plate scrap	65.00

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	39.00
Stove plate	38.00
Heavy breakable	38.00
Unstripped motor blocks	27.00
Clean auto cast	52.00
Malleable	52.00

BIRMINGHAM

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	34.00-35.00
No. 1 bundles	37.00-38.00
No. 2 bundles	29.00-30.00
No. 1 busheling	37.00-38.00
Cast iron borings	21.50-22.50
Short shovel turnings	32.00-33.00
Machine shop turnings	31.00-32.00
Electric furnace bundles	44.00-45.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	47.50-48.00
Stove plate	44.50-45.50
Bar crops and plate	*52.00-53.00*
Structural & plate, 2 ft	*51.00-52.00*
Unstripped motor blocks	37.00-38.00
Charging box cast	32.00-33.00
No. 1 wheels	39.00-40.00

Railroad Scrap

No. 1 R.R. heavy melt.	49.00-50.00
Rails, 18-in. and under	61.00-62.00
Rails, rerolling	63.00-64.00
Rails, random lengths	58.00-59.00
Angles, splice bars	58.00-59.00

PHILADELPHIA

No. 1 heavy melting	56.00
No. 2 heavy melting	47.00
No. 1 bundles	56.00
No. 2 bundles	45.00
No. 1 busheling	56.00
Electric furnace bundles	57.00
Mixed borings, turnings	39.00
Machine shop turnings	38.00
Short shovel turnings	42.00
Heavy turnings	52.00
Structurals & plates	59.00-60.00
Couplers, springs, wheels	*62.00-63.00*
Rail crops, 2 ft & under	68.00

Cast Iron Grades

No. 1 cupola	*51.00-52.00*
Malleable	*70.00*
Heavy breakable cast	54.00
Drop broken machinery	56.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	49.00-50.00
No. 2 heavy melting	40.00-41.00
No. 1 bundles	49.00-50.00
No. 2 bundles	37.00-38.00
Machine shop turnings	29.50-30.50
Mixed borings, turnings	31.00-32.00
Short shovel turnings	33.00-34.00
Low phos. (structural & plate)	50.00-51.00

Cast Iron Grades

No. 1 cupola	*43.00-44.00*
Unstripped motor blocks	33.00-35.00
Heavy breakable	46.00-47.00

Stainless Steel

18-8 sheets, clips solids	320.00-325.00
18-8 borings, turnings	150.00-160.00
430 sheets, clips, solids	120.00-125.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	47.50-48.00
No. 2 heavy melting	*36.50-37.00*
No. 1 bundles	46.50-47.00
No. 2 bundles	*36.00-36.50*
No. 1 busheling	46.00-47.00
Machine shop turnings	28.00-28.50
Mixed borings, turnings	29.00-29.50
Short shovel turnings	31.00-31.50
No. 1 cast	41.50-42.00
Mixed cupola cast	*41.00-42.00*
No. 1 machinery cast	*45.00-46.00*

BUFFALO

No. 1 heavy melting	55.00-56.00
No. 2 heavy melting	41.00-42.00
No. 1 bundles	55.00-56.00
No. 2 bundles	38.00-39.00
No. 1 busheling	55.00-56.00
Mixed borings, turnings	31.00-32.00
Machine shop turnings	31.00-32.00
Short shovel turnings	34.00-35.00
Cast iron borings	31.00-32.00
Low phos.	57.00-58.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	50.00-51.00
No. 1 machinery	54.00-55.00

Railroad Scrap

Rails, random lengths	58.00-59.00
Rails, 3 ft and under	64.00-65.00
Railroad specialties	59.00-60.00

CINCINNATI

(Broker's buying prices; f.o.b. shipping point)

No. 1 heavy melting	53.00-54.00
No. 2 heavy melting	43.00-44.00
No. 1 bundles	53.00-54.00
No. 2 bundles	40.00-41.00
No. 1 busheling	53.00-54.00
Machine shop turnings	32.00-33.00
Mixed borings, turnings	33.50-34.50
Short shovel turnings	35.50-36.50
Cast iron borings	32.00-33.00
Low phos., 18 in.	58.00-59.00

Cast Iron Grades

No. 1 cupola	*50.00-51.00*
Heavy breakable cast	*48.00-49.00*
Charging box cast	*48.00-49.00*
Drop broken machinery	58.00-59.00

Railroad Scrap

No. 1 R.R. heavy melt.	62.00-63.00
Rails, 18 in. and under	70.00-71.00
Rails, random lengths	62.00-63.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	45.00
No. 2 heavy melting	42.50
No. 1 bundles	45.00
No. 2 bundles	38.50
No. 1 busheling	45.00
Machine shop turnings	28.00
Short shovel turnings	29.50

Cast Iron Grades

No. 1 cupola	46.00
Charging box cast	45.00
Heavy breakable cast	43.00
Unstripped motor blocks	43.00
Brake shoes	45.00
Clean auto cast	*48.00*
Stove plate	43.00

Railroad Scrap

No. 1 R.R. heavy melt.	57.50
Rails, 18 in. and under	*70.00*
Rails, random lengths	*65.00*
Rails, rerolling	72.50
Angles, splice bars	*60.00*

SEATTLE

No. 1 heavy melting	39.00
No. 2 heavy melting	33.00-35.00
No. 1 bundles	35.00
No. 2 bundles	26.00
No. 3 bundles	17.00
Machine shop turnings	15.00-16.00
Mixed borings, turnings	15.00-16.00
Short shovel turnings	15.00-16.00
Electric furnace, bundles	52.00-55.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	43.00
Heavy breakable cast	35.00
No. 1 wheels	35.00
Unstripped motor blocks	30.00
Clean motor blocks	35.00
Stove plate (f.o.b. plant)	30.00
Brake shoes	30.00

Railroad Scrap

Rails, random lengths	38.00

LOS ANGELES

No. 1 heavy melting	38.00
No. 2 heavy melting	32.00
No. 1 bundles	37.00
No. 2 bundles	28.00
Machine shop turnings	17.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	42.00

SAN FRANCISCO

No. 1 heavy melting	36.00
No. 2 heavy melting	30.00
No. 1 bundles	35.00
No. 2 bundles	26.00
No. 1 busheling	36.00
Machine shop turnings	20.00-23.00
Mixed borings, turnings	20.00-23.00
Cast iron borings	20.00-23.00
Short shovel turnings	25.00
Cut structurals	45.00
Heavy turnings	20.00-23.00
Punchings & plate scrap	44.00

Cast Iron Grades

No. 1 cupola	45.00
Charging box cast	35.00
Stove plate	39.00
Heavy breakable cast	36.00
Unstripped motor blocks	32.00
Brake shoes	35.00
Clean auto cast	45.00
No. 1 wheels	39.00
Burnt cast	23.00
Drop broken machinery	50.00

HAMILTON, ONT.

No. 1 heavy melting	50.50
No. 2 heavy melting	46.50
No. 1 bundles	50.50
No. 2 bundles	43.00
Mixed steel scrap	44.50
Mixed borings, turnings	24.00
Rails, remelting	58.50
Busheling, new factory: Prepared	48.50
Unprepared	44.50
Short steel turnings	27.50

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b., shipping point.

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For over half a century our experience, personnel, equipment and key office locations have contributed to the steady growth of the iron and steel industry. Possibly our facilities may help you solve a problem in iron or steel scrap—no matter how big or small.
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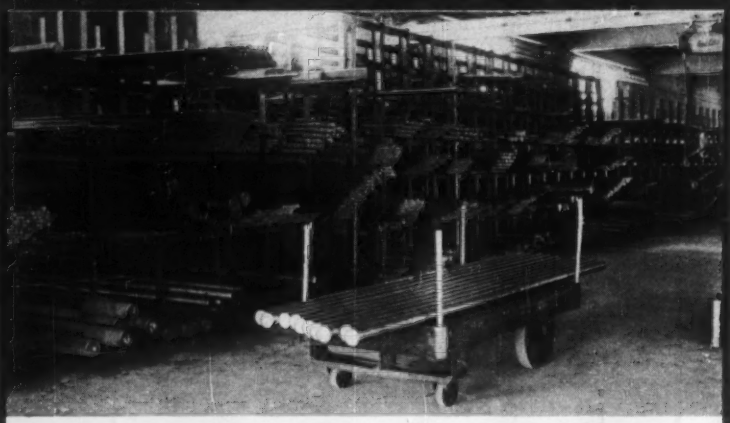

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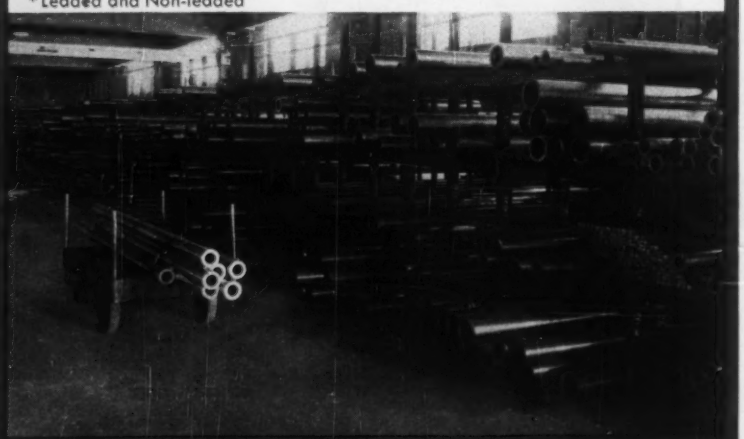
Write for current stock list.

* Leaded and Non-leaded



PETERSON STEELS, INC.

UNION, NEW JERSEY

DETROIT, MICHIGAN • CHICAGO, ILLINOIS

(*Concluded from page* 161)

cutbacks of $2 a ton occurred in random length rails, angles and splice bars. Clean auto cast and rails, 18 in. and under, were down $1 a ton.

Cleveland—Belief is strong in the scrap trade here that the market has hit the top and is now easing off. Automotive lists are just beginning to come out and early indications are that prices will be off $3 to $5 a ton. Other grades will ease proportionately. Brokers point out that business is still good and that the movement toward more realistic price levels is a healthy development. Pending further reports on the automotive business, prices here are quoted $1 a ton lower on most grades.

Birmingham—Although the market for open-hearth scrap is easier, some brokers are taking losses of $2 or more to cover old orders. Others are awaiting developments and have halted buying at least temporarily. Mills are still out of the market and give no indication when they will buy again. Dealers are continuing to ship sizable amounts of scrap to northern mills, where prices continue much higher than in this district. Demand shows no sign of slowing down. The export market stays firm. Cast purchases have slowed down.

San Francisco—A rise in steel scrap prices early in May is almost a certainty, following the advances in prices in other districts. Mills are not pressed for material, and ample supplies are being generated.

Seattle — Undertone of the scrap market is firm here. A price advance may develop in May. No. 1 heavy melting steel is quoted at $39; No. 2, $35; other items are in the same ratio. Receipts are ample for current requirements. Export business continues active on the basis of orders booked several months ago; current buying by Japan is restricted.

Rails, Cars . . .

Track Material Prices, Page 145

Youngstown Sheet & Tube Co., Youngstown, increased prices $3 a ton for railroad track spikes, effective as of Apr. 2. The new price is $8.05 per 100 lb, f.o.b. Struthers, O., and Indiana Harbor, Ind.

Award of 1800 freight cars by the Atlantic Coast Line and the reported placing of 2100 by the Louisville & Nashville have given a sagging railroad equipment market a boost. On the basis of the Atlantic Coast Line award alone, bookings for April will exceed awards in each of the preced-

ing two months and will fall behind January by only 18 cars.

Domestic freight car orders dropped in March. According to a joint statement by the American Railway Car Institute and the Association of American Railways, March buying involved 1618 cars, compared with 1675 in February and 2156 in the corresponding period of last year.

Deliveries increased to 5949, the highest figure since November, 1953, when 6137 cars were delivered. February's deliveries totaled 4881; those for March a year ago, 2833.

Order backlogs were reduced to 137,070 cars on Apr. 1, compared with 141,437 on Mar. 1, and only 17,974 on Apr. 1, 1955.

Steel Leader Comments

Roger M. Blough is hopeful for labor peace this summer. A price review is in the making

ASKED ABOUT the chances for a steel strike this summer, U. S. Steel Corp.'s Roger M. Blough, chairman, said: "We are always hopeful we can reach an amiable agreement."

Mr. Blough stated that no one can assess the possibilities of a strike until negotiations get well under way. Supplementary Unemployment Benefits will be one issue, he believes, although U. S. Steel has no formal notice of demands from the union.

Another issue will be the demand for time and a half pay for Saturday and double time for Sunday work. Mr. Blough said such a demand would be "prohibitively high."

Price Review—U. S. Steel is not contemplating a general price advance at this time, but the outcome of the labor negotiations will see a review of its pricing policies.

"In the meantime," Mr. Blough said, "we will continue to review individual products with regard to market and competitive conditions and cost relationships. There may be one or two changes in the near future."

Quarterly Record — For the first quarter of the year, U. S. Steel reported ingot production of 9.6 million tons, compared with 9.5 million tons in the last quarter of 1955, the previous record quarter (see table, page 161). Production was 8.2 million tons in the first quarter of last year.

U. S. Steel's first quarter earnings set a new record for that quarter, while sales were an all-time quarterly record (see page 63).

"We are not fearful of the future," Mr. Blough said. "We foresee continued growth in our economy, and we plan to keep in step with that growth." He added that a "solid, effective deterrent to inflation is continued expansion of production facilities."

Requirements—The automotive industry will continue to be the heavy consumer of steel that it has been. Last year about 24 per cent of all finished steel went to the auto firms; this year they'll take about 20 per cent.

Steel exports this year, predicted Mr. Blough, will be 4.4 million tons, up slightly from 1955's. Imports will be about the same as last year's, 1.2 million tons.

Because of the tight situation in scrap, U. S. Steel is not currently buying its full requirements; to some extent it is drawing on inventories.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3500 tons, estimated, drilling platform, C. G. Glasscock Drilling Co., Corpus Christi, Tex.,

CLASSIFIED

Help Wanted

ONLY THE BEST

We need competent metallurgist who likes people —therefore enjoys success in technical sales; who knows ferrous melting; who likes to guide his own destiny—therefore aspires to management; who is resourceful, imaginative, creative—therefore above average. Knowledge of tool, stainless, superalloys desirable. Home base will be Detroit area. Tell us about yourself and we'll do the same. WalMet, 1999 Guoin, Detroit 7, Mich.

STRUCTURAL STEEL DETAIL DRAFTSMAN with minimum of 5 years experience detailing for structural steel fabricators. Excellent opportunity for ambitious dependable man, who would like to grow into responsible position. Salary $3.00 to $3.50 per hour depending on qualifications. Attractive working conditions in central California City. Box No. 412, STEEL, Penton Bldg., Cleveland 13, Ohio.

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Executive age 41 seeks position as Production, Plant or General Manager with responsible steel fabricating plant. Thoroughly experienced in all phases of technical & administrative workings of such plant. 21 years as successful Plant and Works Mgr. in structural, plate and alloy steel fabrication. Will relocate. Write Box 414, STEEL, Penton Bldg., Cleveland 13, Ohio.

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4 inch head—⅝ inch arbor
Usable condition—will consider reasonable offer.

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Supervisor

A considerable amount of recent cold-forming mill experience required. Applicant must be able to completely manage a steel pipe manufacturing department. Must be able to train and instruct necessary operators in modern techniques of automatic welding, etc. Technical knowledge essential. Supervisor will be required to recognize and correct technical difficulties. This position will offer growth and progress with one of California's largest steel fabricating manufacturers. Send complete confidential resume and salary requirements with personal photograph if available to Box 410, STEEL, Penton Bldg., Cleveland 13, Ohio.

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A man experienced in the manufacture of Machine Screws—Must be expert Header Mechanic and assume complete charge. Can purchase stock in company. Please supply full information and expected remuneration.

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Permanent positions for structural draftsmen having at least three years experience, with structural steel fabricators, on bridge and building work. Modern air-conditioned office with all employe benefits.

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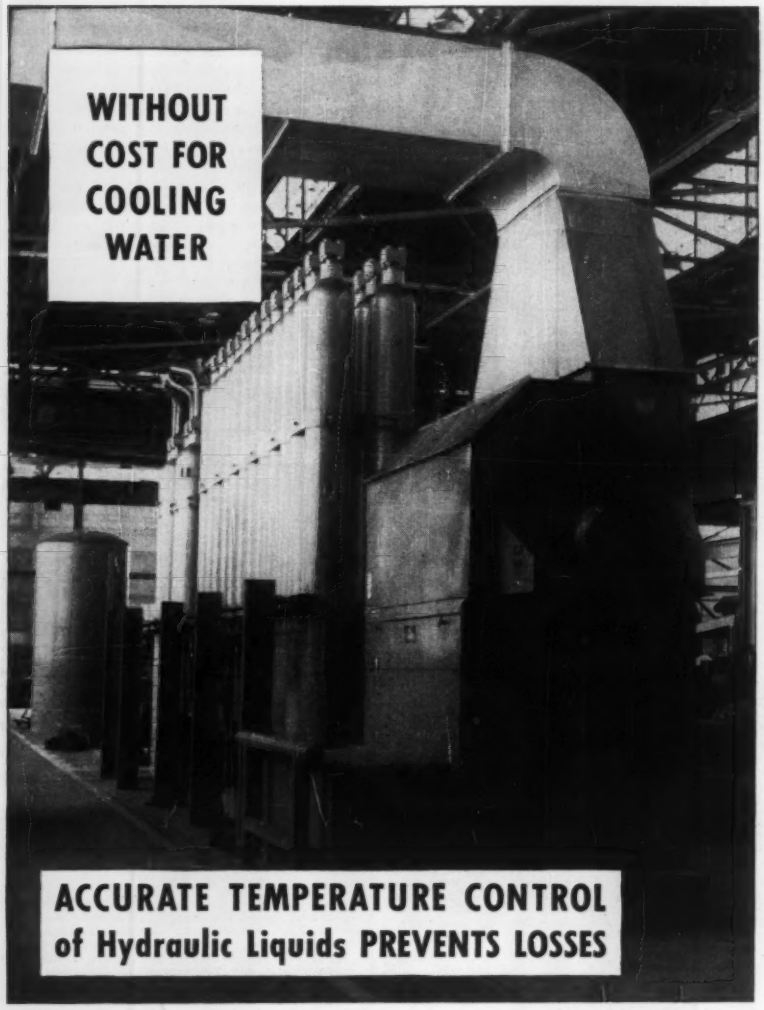

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Niagara District Engineers in Principal Cities of United States and Canada

to Bethlehem Steel Co., Bethlehem, Pa.

3000 tons or more, steering gear plant, Ford Motor Co., Indianapolis, to International Steel Co., Evansville, Ind.

220 tons, Washington state underpass, Thurston county, to Isaacson Iron Works, Seattle; Erickson Paving Co., Bellevue, Wash., general contractor.

STRUCTURAL STEEL PENDING

2250 tons, Washington state bridge, Maple street, Spokane; U. S. Steel Corp., Portland, Oreg., low on superstructure.

1317 tons, state bridge work, Monticello and Liberty, Sullivan county, New York; John Arborio Inc., Poughkeepsie, N. Y., low on general contract.

600 tons, plant, Houston, for Rohm & Haas, Philadelphia; bids closed.

460 tons, state bridge work, near Binghamton, New York; Binghampton Bridge & Foundation Co., low on general contract.

314 tons, Washington state bridge, Maple street, Spokane; Henry Hagman, Cashmere, Wash., low for steel piling substructure; Morrison-Knudsen Co., Seattle, low for alternative concrete pile substructure.

300 tons, estimated, high school, Upper Darby, Pa.; pending; Wark Co., Philadelphia, general contractor.

151 tons, state bridge work, Edison Township, Middlesex county, New Jersey; bids May 1.

REINFORCING BARS . . .

REINFORCING BARS PLACED

150 tons, Penn Valley school, Philadelphia, to Concrete Steel Co., that city.

119 tons, Seattle church and state bridge at Kirkland, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle.

104 tons, Evergreen pumping station, Quincy, Wash., for Bureau of Reclamation, to Bethlehem Pacific Coast Steel Corp., Seattle.

REINFORCING BARS PENDING

1600 tons, Pelton dam, Deschutes river, Oregon, for Portland General Electric Co., Portland, Oreg.; general contract to Guy F. Atkinson Co., South San Francisco, Calif.

830 tons, Washington state bridge, Maple street, Spokane; bids in also on alternatives.

300 tons, prestressed concrete steel, state work, Pennsylvania boulevard, Philadelphia; F. A. Canuso, that city, general contractor.

100 tons, Washington state highway projects, Klickitat and Whatcom counties; bids to Olympia, May 8.

PLATES . . .

PLATES PENDING

100 tons or more, 1 million gallon steel water tank, ground level; bids to Madras, Oreg., May 7.

PIPE . . .

CAST IRON PIPE PENDING

500 tons, 24,000 ft, 6-to-12in. cast iron pipe, also 15,000-ft, 12-in. steel pipe; Santa Clara district, Eugene, Oreg.; installation bids May 8; district to supply materials.

RAILS, CARS . . .

RAILROAD CARS PLACED

Atlantic Coast Line, 1800 freight cars; 800 seventy-ton steel underframe pulpwood cars, to ACF Industries Inc.'s St. Charles, Mo., shops; 800 seventy-ton cement-type hopper cars, to ACF shops at Berwick, Pa.; and 200 seventy-ton phosphate rock-type hopper cars to Greenville Steel Car Co., Greenville, Pa.

Louisville & Nashville, 2100 seventy-ton coal hopper cars, to Bessemer, Ala., plant of Pullman-Standard Car Mfg. Co.; cost, about $16 million; delivery to start early in 1957.

Northern Pacific, one rail diesel car, to The Budd Co., Philadelphia.

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When an electrode with the speed of Jetweld

Has easy operation in all positions

Yet costs less than other iron powder electrodes

WHY use anything but Improved FLEETWELD 47 on hard-to-position jobs

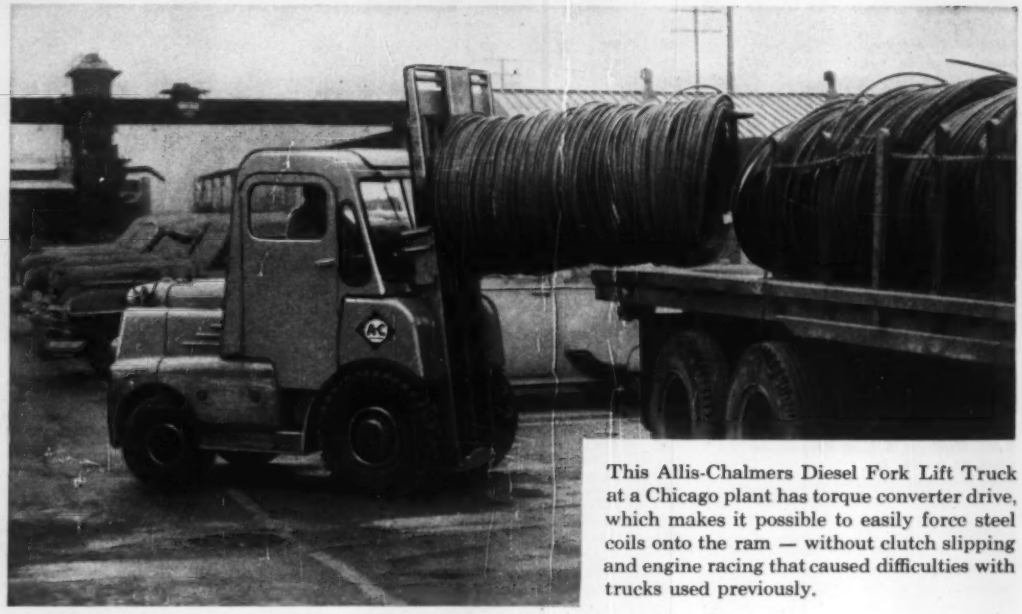
Ask

THE LINCOLN ELECTRIC COMPANY

Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

Allis-Chalmers Fork Lift Trucks...



This Allis-Chalmers Diesel Fork Lift Truck at a Chicago plant has torque converter drive, which makes it possible to easily force steel coils onto the ram — without clutch slipping and engine racing that caused difficulties with trucks used previously.

stay on the job longer...

Reports of Allis-Chalmers Fork Trucks working thousands of hours without lost time are not unusual. Such records are not surprising, either, to those who know the long-life, low maintenance features engineered into these trucks.

Their rugged construction is typified by the all-welded, automotive-type frame — strongest used. Double-reduction axle and heavy-duty, four-pinion differential lengthen service life. Precision-built mast is of special-rolled, high-strength steel channel sections. Such features as these add up to *more time on the job.*

get back to work faster

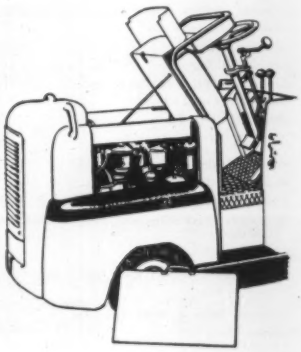
The Allis-Chalmers Fork Lift Truck is a service-man's dream!

It takes only 22 seconds to strip for service. Lift off two side panels, tip seat forward, remove engine cowl by unscrewing two wing nuts — and everything is right there.

It takes only 22 minutes for two men to disassemble — right down to the bare frame! There are only 20 bolts and nuts to remove.

It takes only 30 minutes to change a clutch. To get at it, you simply remove the floor boards. Clutch plate is replaced without disturbing transmission or axle.

Ask your dealer to show you how Allis-Chalmers Fork Trucks make possible many bonus hours of low-cost operation.



In but 22 seconds, engine, carburetor, oil filler tube, oil filter, fuel pump, battery and ignition system—all are accessible for servicing.

ALLIS-CHALMERS, BUDA DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

BH-6A

Farval provides foolproof lubrication for 50-spindle drilling machine

FARVAL—
Studies in Centralized Lubrication
No. 181

GOOD lubrication plays a vital part in the success of any drilling machine. It boosts output, cuts costs and extends machine life.

Barnes Drill Company of Rockford, Illinois, has offered its customers the benefit of Farval Centralized Lubrication since 1945. Thousands of bearings on Barnesdril equipment are being protected by over 100 factory-installed Farval systems.

What Farval does

As a machine user, you, too, can get that extra production and protection with Farval. Standardize your lubrication by placing Farval on all types of equipment throughout your factory. Farval lubricates while the equipment is in operation, delivering a measured amount of clean lubricant to every bearing whenever necessary. No bearings are ever missed.

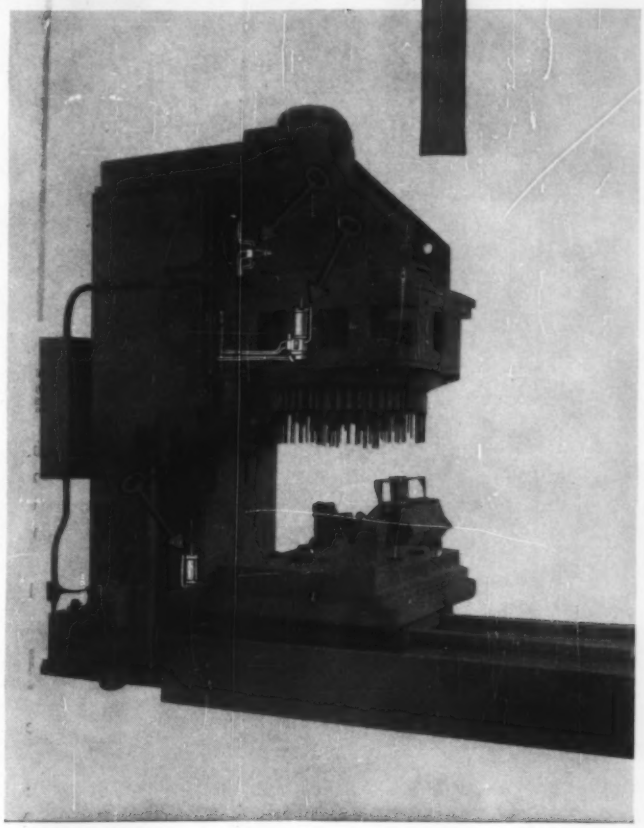
Farval measuring valves automatically distribute the correct charge to each bearing throughout the system circuit. Farval sends the lubricant from a conveniently located pumping unit, eliminating machine shutdown time and providing an unparalleled degree of safety.

Free lubrication survey

Whether your equipment is old or new, a Farval Centralized Lubrication System will serve it better. We would be glad to send one of our lubrication engineers to inspect your plant equipment. He will present a written analysis of what Farval can do for you—without obligation, of course. The savings will look good. Ask for Bulletin 26-R.

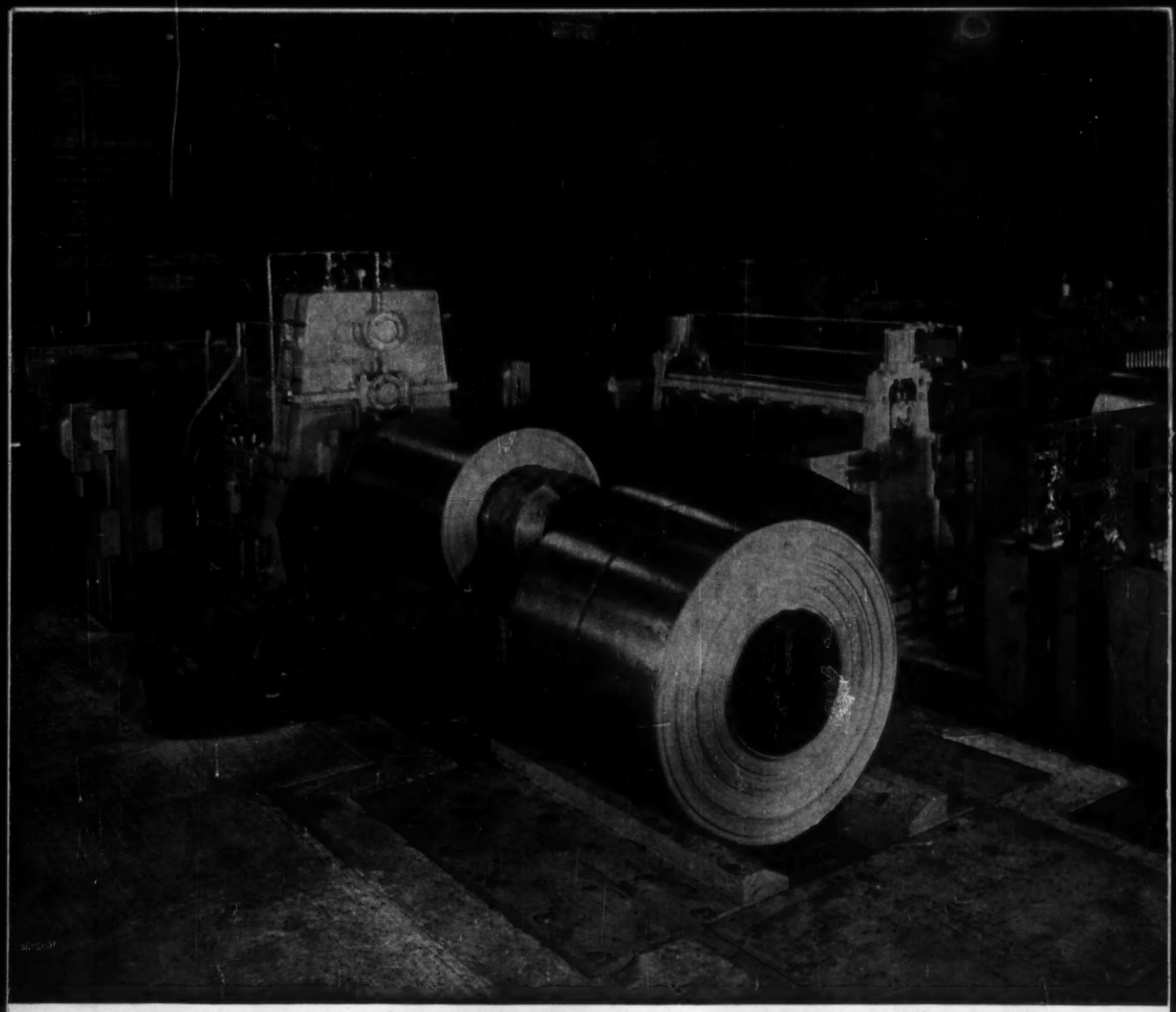
The Farval Corporation, 3270 East 80th Street, Cleveland 4, Ohio.

Affiliate of The Cleveland Worm and Gear Company, Industrial Worm Gearing. In Canada: Peacock Brothers Limited.



KEYS TO ADEQUATE LUBRICATION—Wherever you see the Farval valve manifolds, dual lubricant lines and central pumping station, you know a machine is being properly lubricated.

This *Farvalized* special vertical drilling machine, built by Barnes for a Midwestern aircraft engine manufacturer, is a saddle-type unit, arranged with a 50-spindle adjustable center auxiliary head with slip-type spindle construction.



Wean Flying Shear Line (Entry End)

The WEAN ENGINEERING COMPANY, Inc.

WARREN ---------- OHIO

In the past decade steel making has made advancements in product development and production unmatched by any other industry.

The demand for better, more versatile steels, at rates that a few short years ago were beyond comprehension, has furnished the impetus. But the backbone of this tremendous revolution has been supplied by experienced metallurgists, who developed the materials, and engineering firms, like Wean, who designed and built the machinery necessary.

Equipment designed and built by Wean continues to establish performance records wherever it is in operation. This is the kind of progress that causes leading steel producers the world over to make certain they talk with Wean before they buy.

SPECIALISTS IN SHEET, STRIP AND TIN MILL EQUIPMENT